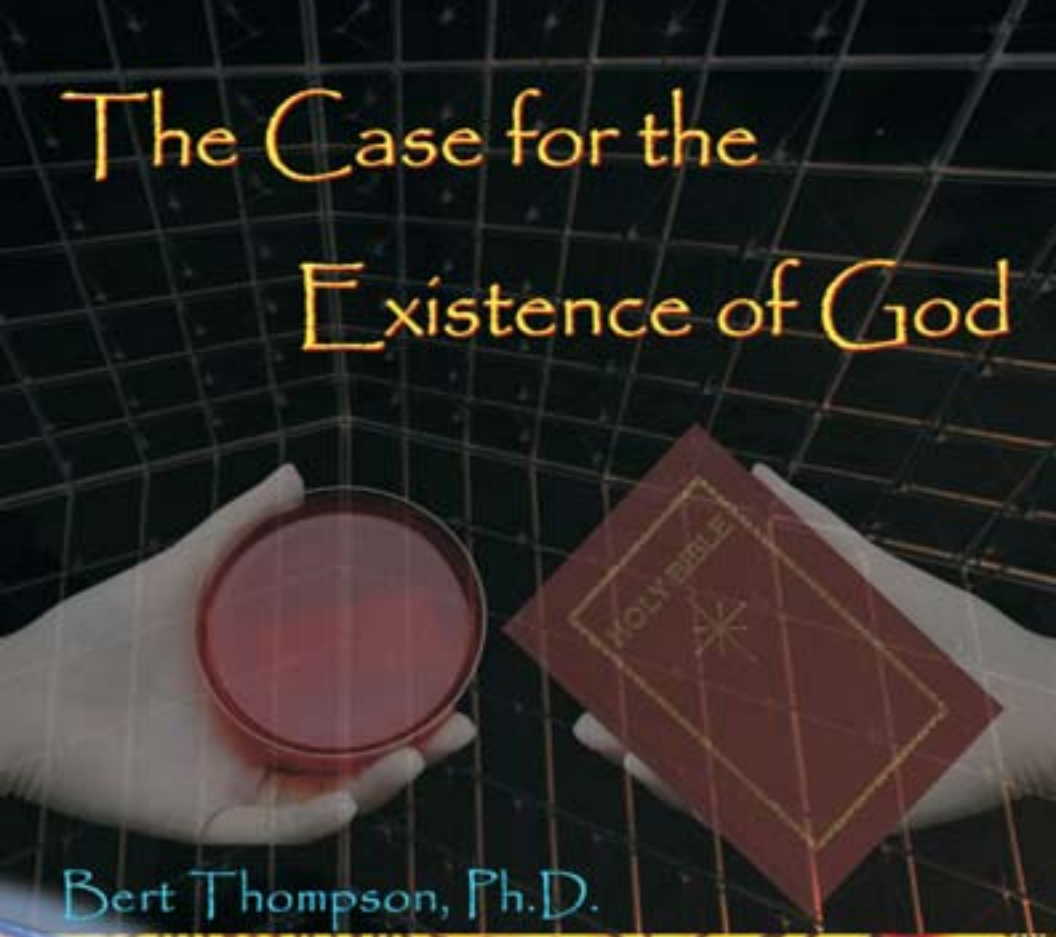
The Case for the Existence of God



Bert Thompson, Ph.D.

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The Case for the Existence of God

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1

INTRODUCTION

One of the most basic, and most fundamental, issues that can be considered by the human mind is the question, "Does God exist?" In the field of logic, there are principles–or as they are called more often, laws–that govern human thought processes and that are accepted as analytically true. One of these is the Law of the Excluded Middle. When applied to objects, this law states that an object cannot both possess and not possess a certain trait or characteristic at the same time and in the same fashion. When applied to propositions, this law states that all precisely stated propositions are either true or false; they cannot be both true and false at the same time and in the same fashion.

The statement, "God exists," is a precisely stated proposition. Thus, it is either true or false. The simple fact is, either God exists or He does not. There is no middle ground. One cannot affirm logically both the existence and nonexistence of God. The atheist boldly states that God does not exist; the theist affirms just as boldly that God does exist; the agnostic laments that there is not enough evidence to make a decision on the matter; and the skeptic doubts that God's existence can be proven with certainty. Who is correct? Does God exist or not?

The only way to answer this question, of course, is to seek out and examine the evidence. It certainly is reasonable to suggest that if there is a God, He would make available to us

evidence adequate to the task of proving His existence. But does such evidence exist? And if it does, what is the nature of that evidence?

The theist advocates the view that evidence is available to prove conclusively that God does exist and that this evidence is adequate to establish beyond reasonable doubt the existence of God. However, when I employ the word "prove," I do not mean that God's existence can be demonstrated scientifically in the same fashion that one might prove that a sack of potatoes weighs ten pounds or that a human heart has four distinct chambers within it. Such matters as the weight of a sack of vegetables, or the divisions within a muscle, are matters that may be verified empirically using the five senses. And while empirical evidence often is quite useful in establishing the validity of a case, it is not the sole means of arriving at proof. For example, legal authorities recognize the validity of a *prima facie* case, which is acknowledged to exist when adequate evidence is available to establish the presumption of a fact that, unless such fact can be refuted, legally stands proven (see Jackson, 1974, p. 13). It is the contention of the theist that there is a vast body of evidence that makes an impregnable *prima facie* case for the existence of God–a case that simply cannot be refuted. I would like to present here the *prima facie* case for the existence of God, along with a sampling of the evidence upon which that case is based.

2

CAUSE AND EFFECT– THE COSMOLOGICAL ARGUMENT

Throughout human history, one of the most effective arguments for the existence of God has been the cosmological argument, which addresses the fact that the Universe (Cosmos) is here and therefore must be explained in some fashion. In his book, *Not A Chance,* R.C. Sproul observed:

> Traditional philosophy argued for the existence of God on the foundation of the law of causality. The cosmological argument went from the presence of a cosmos back to a creator of the cosmos. It sought a rational answer to the question, "**Why** is there something rather than nothing?" It sought a sufficient reason for a real world (1994, p. 169, emp. in orig.).

The Universe exists and is real. Atheists and agnostics not only acknowledge its existence, but admit that it is a grand effect (e.g., see Jastrow, 1977, pp. 19-21). If an entity cannot account for its own being (i.e., it is not sufficient to have caused itself), then it is said to be "contingent" because it is dependent upon something outside of itself to explain its existence. The Universe is a contingent entity since it is inadequate to cause, or explain, its own existence. Sproul has noted: "Logic requires that if something exists contingently, it must have a cause. That is merely to say, if it is an effect it must have an an-

tecedent cause" (1994, p. 172). Thus, since the Universe is admittedly a contingent effect, the obvious question becomes, "What **caused** the Universe?"

It is here that the Law of Cause and Effect (also known as the Law of Causality) is tied firmly to the cosmological argument. Scientists, and philosophers of science, recognize laws as "reflecting actual regularities in nature" (Hull, 1974, p. 3). So far as scientific knowledge can attest, laws know no exceptions. This certainly is true of the Law of Cause and Effect. It is, indisputably, the most universal, and most certain, of all scientific laws.

This law has been stated in a variety of ways, each of which adequately expresses its ultimate meaning. Kant, in the first edition of *Critique of Pure Reason*, stated that "everything that happens (begins to be) presupposes something which it follows according to a rule." In the second edition, he strengthened that statement by noting that "all changes take place according to the law of connection of cause and effect" (see Meiklejohn, 1878, p. 141). Schopenhauer stated the proposition as: "Nothing happens without a reason why it should happen rather than not happen" (as quoted in von Mises, 1951, p. 159). The number of various formulations could be expanded almost indefinitely. But simply put, the Law of Causality states that **every material effect must have an adequate antecedent cause**.

The philosophical/theological implications of this concept–pro and con–have been argued through the years. But after the dust settles, the Law of Causality always remains intact. There is no question of its acceptance in the world of experimental science or in the ordinary world of personal experience. Many years ago, professor W.T. Stace, in his classic work, *A Critical History of Greek Philosophy*, commented:

> Every student of logic knows that this is the ultimate canon of the sciences, the foundation of them all. If we did not believe the truth of causation, namely, everything which has a beginning has a cause, and that

> in the same circumstances the same things invariably happen, all the sciences would at once crumble to dust. In every scientific investigation this truth is assumed (1934, p. 6).

The Law of Causality is not of importance just to science. Richard von Mises observed: "We may only add that almost all philosophers regard the law of causality as the most important, the most far-reaching, and the most firmly founded of all principles of epistemology." He then added:

> The law of causality claims that for **every** observable phenomenon (let us call it *B*) there exists a second phenomenon *A*, such that the sentence "*B* follows from *A*" is true.... There can be no doubt that the law of causality in the formulation just stated is in agreement with all our own experiences and with those which come to our knowledge in one way or another.... [We] can also state that in practical life there is hardly a more useful and more reliable rule of behavior than to **assume** of any occurrence that we come to know that some other one preceded it as its cause (1951, p. 160, emp. in orig.).

Richard Taylor, addressing the importance of this basic law of science in *The Encyclopedia of Philosophy*, wrote:

> Nevertheless, it is hardly disputable that the idea of causation is not only indispensable in the common affairs of life but in all applied science as well. Jurisprudence and law would become quite meaningless if men were not entitled to seek the causes of various unwanted events such as violent deaths, fires, and accidents. The same is true in such areas as public health, medicine, military planning, and, indeed, every area of life (1967, p. 57).

Just as the Law of the Excluded Middle (discussed in chapter 1) is true analytically, so the Law of Cause and Effect is true analytically as well. Sproul addressed this when he wrote:

> The statement "Every effect has an antecedent cause" is **analytically true**. To say that it is analytically or formally true is to say that it is true by definition or analysis. There is nothing in the predicate that is not already contained by resistless logic in the subject. It is like the statement, "A bachelor is an unmarried man" or "A triangle has three sides" or "Two plus two are four...." Cause and effect, though distinct ideas, are inseparably bound together in rational discourse. It is meaningless to say that something is a **cause** if it yields no **effect**. It is likewise meaningless to say that something is an **effect** if it has no **cause**. A cause, by definition, must have an effect, or it is not a cause. An effect, by definition, must have a cause, or it is not an effect (1994, pp. 172,171 emp. in orig.).

Effects without adequate causes are unknown. Further, causes never occur subsequent to the effect. It is meaningless to speak of a cause following an effect, or an effect preceding a cause. In addition, the effect never is qualitatively superior to, nor quantitatively greater than, the cause. This knowledge is responsible for our formulation of the Law of Causality in these words: Every material effect must have an **adequate** antecedent cause. The river did not turn muddy because the frog jumped in; the book did not fall from the table because the fly lighted on it. These are not adequate causes. For whatever effects we observe, we must postulate adequate antecedent causes –which brings us back to the original question: What **caused** the Universe?

There are but three possible answers to this question: (1) the Universe is eternal; it always has existed and always will exist; (2) the Universe is not eternal; rather, it created itself out of nothing; (3) the Universe is not eternal, and did not create itself out of nothing; rather, it was created by something (or Someone) anterior, and superior, to itself. These three options merit serious consideration.

IS THE UNIVERSE ETERNAL?

The front cover of the June 25, 2001 issue of *Time* magazine announced: "How the Universe Will End: Peering Deep Into Space and Time, Scientists Have Just Solved the Biggest Mystery in the Cosmos." Comforting thought, isn't it, to know that the "biggest mystery in the Cosmos" has been figured out? But what, exactly, is that mystery? And why does it merit the front cover of a major news magazine?

The origin and destiny of the Universe always have been important topics in the creation/evolution controversy. In the past, evolutionists went to great extremes to present scenarios that included an eternal Universe, and they went to the same extremes to avoid any scenario that suggested a Universe with a beginning or end because such a scenario posed bothersome questions. In his book, *God and the Astronomers*, the eminent evolutionary astronomer Robert Jastrow, who currently is serving as the director of the Mount Wilson Observatory, put it like this:

> The Universe is the totality of all matter, animate and inanimate, throughout space and time. If there was a beginning, what came before? If there is an end, what will come after? On both scientific and philosophical grounds, the concept of an eternal Universe seems more acceptable than the concept of a transient Universe that springs into being suddenly, and then fades slowly into darkness.
>
> Astronomers try not to be influenced by philosophical considerations. However, the idea of a Universe that has both a beginning and an end is distasteful to the scientific mind. In a desperate effort to avoid it, some astronomers have searched for another interpretation of the measurements that indicate the retreating motion of the galaxies, an interpretation that would not require the Universe to expand. If the evidence for the expanding Universe could be explained

> away, the need for a moment of creation would be eliminated, and the concept of time without end would return to science. But these attempts have not succeeded, and most astronomers have come to the conclusion that they live in an exploding world (1977, p. 31).

What does Jastrow mean when he says that "these attempts have not succeeded"? And why do evolutionists prefer to avoid the question of a Universe with a beginning? In an interview he granted on June 7, 1994, Dr. Jastrow elaborated on this point. The interviewer, Fred Heeren, asked if there was anything from physics that could explain how the Universe first came to be. Jastrow lamented:

> No, there's not–this is the most interesting result in all of science.... As Einstein said, scientists live by their faith in causation, and the chain of cause and effect. Every effect has a cause that can be discovered by rational arguments. And this has been a very successful program, if you will, for unraveling the history of the universe. But it just fails at the beginning.... So time, really, going backward, comes to a halt at that point. Beyond that, that curtain can never be lifted.... And that is really a blow at the very fundamental premise that motivates all scientists (as quoted in Heeren, 1995, p. 303).

Seventeen years earlier, in his book, *Until the Sun Dies*, Jastrow had discussed this very problem–a Universe without any adequate explanation for its own existence and, worse still, without any adequate cause for whatever theory scientists might set forth in an attempt to elucidate how it did originate. As Jastrow noted:

> This great saga of cosmic evolution, to whose truth the majority of scientists subscribe, is the product of an act of creation that took place twenty billion years ago [according to evolutionary estimates–BT]. Science, un-

> like the Bible, has no explanation for the occurrence of that extraordinary event. The Universe, and everything that has happened in it since the beginning of time, are a grand effect without a known cause. An effect without a cause? That is not the world of science; it is a world of witchcraft, of wild events and the whims of demons, a medieval world that science has tried to banish. As scientists, what are we to make of this picture? I do not know (1977, p. 21).

While Dr. Jastrow may not know **how** the Universe began, there are two things that he and his colleagues **do** know: (1) the Universe had a definite beginning; and (2) the Universe will have a definite ending.

Admittedly, the most comfortable position for the evolutionist is the idea that the Universe is eternal, because it avoids the problem of a beginning or ending and thus the need for any "first cause" such as a Creator. In his book, *Until the Sun Dies*, astronomer Jastrow noted: "The proposal for the creation of matter out of nothing possesses a strong appeal to the scientist, since it permits him to contemplate a Universe without beginning and without end" (1977, p. 32). Jastrow went on to remark that evolutionary scientists preferred an eternal Universe "because the notion of a world with a beginning and an end made them feel so uncomfortable" (p. 33). In *God and the Astronomers*, Dr. Jastrow explained why attempts to prove an eternal Universe had failed miserably. "Now three lines of evidence–the motions of the galaxies, the laws of thermodynamics, and the life story of the stars–pointed to one conclusion; all indicated that the Universe had a beginning" (1978, p. 111). Jastrow–who is considered by many to be one of the greatest science writers of our age–certainly is no creationist. But as a scientist who is an astrophysicist, he has written often on the inescapable conclusion that the Universe had a beginning. Consider, for example, the following statements that have come from his pen:

> Now both theory and observation pointed to an expanding Universe and a beginning in time.... About thirty years ago science solved the mystery of the birth and death of stars, and acquired new evidence that the Universe had a beginning (1978, pp. 47,105).
>
> Arthur Eddington, the most distinguished British astronomer of his day, wrote, "If our views are right, somewhere between the beginning of time and the present day we must place the winding up of the universe." When that occurred, and Who or what wound up the Universe, were questions that bemused theologians, physicists and astronomers, particularly in the 1920's and 1930's (1978, pp. 48-49).
>
> Most remarkable of all is the fact that in science, as in the Bible, the World begins with an act of creation. That view has not always been held by scientists. Only as a result of the most recent discoveries can we say with a fair degree of confidence that the world has not existed forever; that it began abruptly, without apparent cause, in a blinding event that defies scientific explanation (1977, p. 19).

The conclusion to be drawn from the scientific data was inescapable, as Dr. Jastrow himself admitted when he wrote:

> The lingering decline predicted by astronomers for the end of the world differs from the explosive conditions they have calculated for its birth, but the impact is the same: **modern science denies an eternal existence to the Universe, either in the past or in the future** (1977, p. 30, emp. added).

In her book, *The Fire in the Equations*, award-winning science writer Kitty Ferguson wrote in agreement.

> Our late twentieth-century picture of the universe is dramatically different from the picture our forebears had at the beginning of the century. Today it's common knowledge that all the individual stars we see with the naked eye are only the stars of our home galaxy, the Milky Way, and that the Milky Way is only one

> among many billions of galaxies. **It's also common knowledge that the universe isn't eternal but had a beginning ten to twenty billion years ago, and that it is expanding** (1994, p. 89, emp. added).

The evidence clearly indicates that the Universe had a beginning. The Second Law of Thermodynamics, as Dr. Jastrow has indicated, shows this to be true. Henry Morris correctly commented: "The Second Law requires the universe to have had a beginning" (1974, p. 26). Indeed, it does. The Universe is not eternal.

Steady State and Oscillating Universe Theories

One theory that was offered in an attempt to establish the eternality of the Universe was the Steady State model, propagated by Sir Fred Hoyle, Thomas Gold, and Sir Hermann Bondi. Even before they offered this unusual theory, however, scientific evidence had been discovered which indicated that the Universe was expanding. Hoyle and his colleagues set forth the Steady State model to: (a) erase any possibility of a beginning (a nice sidestepping tactic for nasty philosophical questions such as "What came before the beginning?"); (b) bolster the idea of an eternal Universe (another sidestepping tactic for questions such as "What will come after the ending?"); and (c) explain why the Universe was expanding. Their idea was that at certain points in the Universe (which they called "irtrons"), matter was being created spontaneously **from nothing**.

Since this new matter obviously had to "go" somewhere, and since it is a well-established fact of science that two objects cannot occupy the same space at the same time, it pushed the already-existing matter further into distant space. This replenishing "virgin" matter, which allegedly maintained the density at a steady state (thus the name of the model), had the amazing ability to condense into galaxies and everything contained within–stars, planets, comets, and, ultimately, organic life.

Hoyle, Gold, and Bondi asserted that this process of matter continually being created (the idea even came to be known as the "continuous creation" theory) avoided a beginning or ending, while simultaneously accounting for the expansion of the Universe. When asked the question as to the origin of this matter, Hoyle replied that it was a "meaningless and unprofitable" pursuit (1955, p. 342).

For a time, the Steady State hypothesis was quite popular. Eventually, however, it was discarded for a number of reasons. Cosmologist John Barrow has suggested that the Steady State theory proposed by Hoyle and his colleagues sprang "...from a belief that the universe did not have a beginning.... The specific theory they proposed fell into conflict with observation long ago..." (1991, p. 46). Indeed, the Steady State Theory did fall into "conflict with observation" for a number of reasons. First, valid empirical observations no longer fit the model–that is, we now know the Universe had a beginning (see Gribbin, 1986).

Second, new theoretical concepts being proposed were at odds with the Steady State model. In 1978, Arno Penzias and Robert Wilson were honored with the Nobel Prize in physics for their discovery of the cosmic microwave background radiation (referred to variously in the literature as CMB, CMR, or CBR; I will use the CMB designation throughout this discussion). The two Bell Laboratory researchers serendipitously stumbled onto this phenomenon in June 1964, after first thinking it was an equipment malfunction. For a short while, they even attributed the background noise to what they referred to as "white dielectric material"–bird droppings (Fox, 2002, p. 78). The electromagnetic radiation they were experiencing was independent of the spot in the sky where they were focusing the antenna, and was only a faint "hiss" or "hum" in magnitude. The microwaves, which can be related to temperature, produced the equivalent of approximately 3.5 K background radiation at 7.3 cm wavelength ("K" stands for Kelvin, the stan-

dard scientific temperature scale; 0 K equals absolute zero–the theoretical point at which all motion ceases: -459° Fahrenheit or -273° Celsius). Unable to decide why they were encountering this phenomenon, Penzias and Wilson contacted Robert Dicke at Princeton University who, with his colleagues, immediately latched on to this noise as the "echo" of the Big Bang. A prediction had been made prior to the discovery that if the Big Bang were true, there should be some sort of constant radiation in space, although the prediction was for a temperature several times higher (see Hoyle, et al., 2000, p. 80; Weinberg, 1977, p. 50).

When I mentioned in the above paragraph that "new theoretical concepts" eventually dethroned the Steady State Theory, I was referring to Penzias and Wilson's discovery of the cosmic microwave background radiation. Described by some evolutionists as the "remnant afterglow of the Big Bang," it is viewed as a faint light shining back to the beginning of the Universe (well, at least close to the beginning…say, within 300,000 to 400,000 years or so). This radiation, found in the form of microwaves, has been snatched up by Big Bang proponents as the proof of an initial catastrophic beginning–the "bang"–of our Universe. The cosmic background radiation spelled almost instant doom for the Steady State Theory, because the theory did not predict a background radiation (since there was no initial outpouring of radiation in that model). Plus, there was no way to introduce the idea of such background radiation into the existing theory. [For an in-depth review and refutation of the idea of the cosmic background radiation representing proof of the Big Bang Theory, see Thompson, Harrub, and May, 2003b.]

Third (and probably most important), the Steady State Theory violated the First Law of Thermodynamics, which states that neither matter nor energy can be **created** or destroyed in nature. Jastrow commented on this last point when he wrote:

> But the creation of matter out of nothing would violate a cherished concept in science–the principle of the conservation of matter and energy–which states that matter and energy can be neither created nor destroyed. Matter can be converted into energy, and vice versa, but the total amount of all matter and energy in the Universe must remain unchanged forever. It is difficult to accept a theory that violates such a firmly established scientific fact. Yet the proposal for the creation of matter out of nothing possesses a strong appeal to the scientist, since it permits him to contemplate a Universe without beginning and without end (1977, p. 32).

The Steady State model, with its creation of matter from nothing, could not be reconciled with this basic law of science, and thus was abandoned. [However, as the British science journal *Nature* correctly noted, "Nobody should be surprised, therefore, if the handful of those who reject the Big Bang claim the new data as support for their theories also" (see "Big Bang Brouhaha," 1992, 356:731). And, sure enough, Fred Hoyle, Geoffrey Burbidge, and Jayant Narlikar developed what came to be known as the Quasi-Steady-State Theory–a slight variation on the original Steady State Theory, invented to try to make sense of the "chink" in the armor of the original concept, as represented by the cosmic background radiation.]

Unable to overcome these flaws, scientists "steadily" abandoned the Steady State Theory and sought another theory to fill the void. They ended up turning back to the theory that had been proposed earlier by Georges Lemaître and the Russian-American physicist George Gamow–a theory that had been hastily shoved aside by the Steady State model only a few years prior. [Although it probably is not known widely today, the Big Bang–in its original "standard" form–actually came **before** the advent of the Steady State Theory and, ironically, was given its name (intended to be derogatory) by Hoyle as a result of a snide comment made on a live radio show for which he served as host (Fox, 2002, p. 65).]

Slowly but surely, the Big Bang model of the origin of the Universe eclipsed and eventually replaced the Steady State Theory. It postulates that all the matter/energy in the observable Universe was condensed into a particle much smaller than a single proton (the famous "ylem," as it frequently is called). The ylem–an entirely hypothetical construct–was a primordial substance 10^{14} times the density of water, yet smaller in volume than a single proton. As one writer expressed it: "Astonishingly, scientists now calculate that everything in this vast universe grew out of a region many billions of times smaller than a single proton, one of the atom's basic particles" (Gore, 1983, 163:705). The ylem (a.k.a. the "cosmic egg") was a "mind-bogglingly dense atom containing the entire Universe" (Fox, p. 69). [Where, exactly, the cosmic egg is supposed to have come from, no one quite knows; so far, no cosmic chicken has yet been sighted.]

At some point in time, according to Big Bang theorists, the ylem reached its minimum contraction (at a temperature of 10^{32} Celsius–a 1 followed by 32 zeros), and suddenly and violently expanded. Within an hour of this event, nucleosynthesis began to occur. That is to say, the light atoms we recognize today (e.g., hydrogen, helium, and lithium) had been manufactured in the intense heat. As the Universe expanded and cooled, the atoms started "clumping" together, and within a few hundred million years, the coalescing "clumps" began to form stars and galaxies. All the heavier elements are assumed to have been formed later by nuclear fusion within the cores of stars.

The Big Bang model, however, suffered from numerous problems. First, it required that whatever made up the "cosmic egg" be eternal–a concept clearly at odds with the Second Law of Thermodynamics. John Gribbin, a highly regarded evolutionary cosmologist, voiced the opinion of many when he wrote: "The biggest problem with the Big Bang theory of the origin of the Universe is philosophical–perhaps even the-

ological–what was there before the bang?" (1976, pp. 15-16). Mathematician David Berlinski, writing in *Commentary* magazine, concluded:

> Such is the standard version of hot Big Bang cosmology–"hot" in contrast to scenarios in which the universe is cold, and "Big Bang" in contrast to various steady-state cosmologies in which nothing ever begins and nothing ever quite ends. **It may seem that this archeological scenario leaves unanswered the question of how the show started and merely describes the consequences of some Great Cause that it cannot specify and does not comprehend** (1998, p. 30).

It's not just that "it may **seem**" that the Big Bang Theory "leaves unanswered the question of how the show started." It's that it **does** leave such questions unanswered! An article ("The Self-reproducing Inflationary Universe") by famed cosmologist Andrei Linde in the November 1994 issue of *Scientific American* revealed that the standard Big Bang Theory has been "scientifically brain dead" for quite some time. Linde (who, by the way, is the developer of two closely related variations of the Big Bang, known as the chaotic and the eternal inflationary models) is a professor of physics at Stanford University. He listed half a dozen overwhelmingly serious problems with the theory–problems that have been acknowledged (although, sadly, not always in a widely publicized fashion) for years. [For an in-depth review and refutation of the Big Bang Theory, see Thompson, Harrub, and May, 2003a; 2003b; 2003c.] Linde began his obituary for the Big Bang by asking the following question.

> The first, and main, problem is the very existence of the big bang. **One may wonder, What came before?** If space-time did not exist then, how could everything appear from nothing? What arose first: the universe or the laws governing it? Explaining this ini-

> tial singularity–where and when it all began–still remains the most intractable problem of modern cosmology (1994, 271[5]:48, emp. added).

Second, a great deal of time and energy has been expended in an attempt to determine the ultimate fate of the Universe. Will it collapse back on itself in a "Big Crunch," or will it simply continue expanding? In a desperate effort to avoid any vestige of a beginning or any hint of an ending, evolutionists invented the Oscillating Universe model (also known as the Big Bang/Big Crunch model, the Expansion/Collapse model, etc.). Dr. Gribbin suggested that "...the best way round this initial difficulty is provided by a model in which the Universe expands from a singularity, collapses back again, and repeats the cycle indefinitely" (1976, pp. 15-16).

That is to say, there was a Big Bang; but there also will be a Big Crunch, at which time the matter of the Universe will collapse back onto itself. There will be a "bounce," followed by another Big Bang, which will be followed by another Big Crunch, and this process will be repeated *ad infinitum*. In the Big Bang model, there is a permanent end; not so in the Oscillating Universe model, as Dr. Jastrow explained:

> But many astronomers reject this picture of a dying Universe. They believe that the expansion of the Universe will not continue forever because gravity, pulling back on the outward-moving galaxies, must slow their retreat. If the pull of gravity is sufficiently strong, it may bring the expansion to a halt at some point in the future.
>
> What will happen then? The answer is the crux of this theory. The elements of the Universe, held in a balance between the outward momentum of the primordial explosion and the inward force of gravity, stand momentarily at rest; but after the briefest instant, always drawn together by gravity, they commence to move toward one another. Slowly at first, and then with

> increasing momentum, the Universe collapses under the relentless pull of gravity. Soon the galaxies of the Cosmos rush toward one another with an inward movement as violent as the outward movement of their expansion when the Universe exploded earlier. After a sufficient time, they come into contact; their gases mix; their atoms are heated by compression; and the Universe returns to the heat and chaos from which it emerged many billions of years ago (1978, p. 118).

The description provided by Jastrow is that commonly referred to in the scientific literature as the "Big Crunch." But the obvious question after hearing such a scenario is this: After that, then what? Once again, hear Dr. Jastrow:

> No one knows. Some astronomers say the Universe will never come out of this collapsed state. Others speculate that the Universe will rebound from the collapse in a new explosion, and experience a new moment of Creation. According to this view, our Universe will be melted down and remade in the caldron of the second Creation. It will become an entirely new world, in which no trace of the existing Universe remains....
>
> This theory envisages a Cosmos that oscillates forever, passing through an infinite number of moments of creation in a never-ending cycle of birth, death and rebirth. It unites the scientific evidence for an explosive moment of creation with the concept of an eternal Universe. It also has the advantage of being able to answer the question: What preceded the explosion? (1978, pp. 119-120).

This, then, is the essence of the Oscillating Universe theory. Several questions arise, however. First, of what benefit would such events be? Second, is such a concept scientifically testable? Third, does current scientific evidence support such an idea?

Of what benefit would a Big Bang/Big Crunch/Big Bang scenario be? **Theoretically**, as I already have noted, the benefit to evolutionists is that they do not have to explain a Universe with an absolute beginning or an absolute ending. A cyclical Universe that infinitely expands and contracts is obviously much more acceptable than one that demands explanations for both its origin and destiny. **Practically**, there is no benefit that derives from such a scenario. The late astronomer from Cornell University, Carl Sagan, noted: "...[I]nformation from our universe would not trickle into that next one and, from our vantage point, such an oscillating cosmology is as definitive and depressing an end as the expansion that never stops" (1979, pp. 13-14).

But is the Oscillating Universe model testable scientifically? Gribbin suggests that it is.

> The key factors which determine the ultimate fate of the Universe are the amount of matter it contains and the rate at which it is expanding.... In simple terms, the Universe can only expand forever if it is exploding faster than the "escape velocity" from itself.... If the density of matter across the visible Universe we see today is sufficient to halt the expansion we can observe today, then the Universe has always been exploding at less than its own escape velocity, and must eventually be slowed down so much that the expansion is first halted and then converted into collapse. On the other hand, if the expansion we observe today is proceeding fast enough to escape from the gravitational clutches of the matter we observe today, then the Universe is and always was "open" and will expand forever (1981, p. 313).

Does the scientific evidence support the theory of an "oscillating," eternal Universe? In the end, the success or failure of this theory depends, basically, on two things: (1) the amount of matter contained in the Universe, since there must be enough

matter for gravity to "pull back" to cause the Big Crunch; and (2) the amount of gravity available to do the "pulling." The amount of matter required by the theory is one reason why Gribbin admitted: "This, in a nutshell, is one of the biggest problems in cosmology today, the puzzle of the so-called missing mass" (1981, pp. 315-316). Cosmologists, astrophysicists, and astronomers refer to the missing mass as "dark matter." In their book, *Wrinkles in Time*, George Smoot and Keay Davidson remarked:

> We are therefore forced to contemplate the fact that as much as 90 percent of the matter in the universe is both invisible and quite unknown–perhaps unknowable–to us.... Are such putative forms of matter the fantasies of desperate men and women, frantically seeking solutions to baffling problems? Or are they a legitimate sign that with the discovery of dark matter cosmology finds itself in a terra incognita beyond our immediate comprehension? (1993, pp. 164,171).

In his June 25, 2001 *Time* article (which claimed to "solve the biggest mystery in the cosmos"), Michael D. Lemonick dealt with this "puzzle."

> As the universe expands, the combined gravity from all the matter within it tends to slow that expansion, much as the earth's gravity tries to pull a rising rocket back to the ground. If the pull is strong enough, the expansion will stop and reverse itself; if not, the cosmos will go on getting bigger, literally forever. Which is it? One way to find out is to weigh the cosmos–to add up all the stars and all the galaxies, calculate their gravity and compare that with the expansion rate of the universe. If the cosmos is moving at escape velocity, no Big Crunch.
>
> Trouble is, nobody could figure out how much matter there actually was. The stars and galaxies were easy; you could see them. But it was noted as early as the 1930s that something lurked out there besides the glow-

> ing stars and gases that astronomers could see. Galaxies in clusters were orbiting one another too fast; they should, by rights, be flying off into space like untethered children flung from a fast-twirling merry-go-round. Individual galaxies were spinning about their centers too quickly too; they should long since have flown apart. The only possibility: some form of invisible dark matter was holding things together, and while you could infer the mass of dark matter in and around galaxies, nobody knew if it also filled the dark voids of space, where its effects would not be detectable (2001, 157 [25]:51).

In discussing the Oscillating Universe model, astronomers speak (as Dr. Gribbin did in one of the quotes above) of a "closed" or an "open" Universe. If the Universe is **closed**, the Universe will cease its expansion, the Big Crunch could occur (theoretically), and an oscillating Universe becomes (again, theoretically) a viable possibility. If the Universe is **open**, the expansion of the Universe will continue (resulting in a condition known as the Big Chill), and the Big Crunch will not occur, making an oscillating Universe impossible. Joseph Silk commented: "The balance of evidence does point to an **open** model of the universe..." (1980, p. 309, emp. added). Gribbin said: "The consensus among astronomers today is that the universe is **open**" (1981, p. 316, emp. added).

Even more recent evidence seems to indicate that an oscillating Universe is a physical impossibility (see Chaisson, 1992). Evolutionary cosmologist John Wheeler drew the following conclusion based on the scientific evidence available at the time: "With gravitational collapse we come to the end of time. Never out of the equations of general relativity has one been able to find the slightest argument for a 're-expansion' of a 'cyclic universe' or anything other than an end" (1977, p. 15). Astronomer Hugh Ross admitted: "Attempts...to use oscillation to avoid a theistic beginning for the universe all fail" (1991, p. 105).

In an article written for the January 19, 1998 issue of *U.S. News and World Report* ("A Few Starry and Universal Truths"), Charles Petit stated:

> For years, cosmologists have wondered if the universe is "closed" and will collapse to a big crunch, or "open," with expansion forever in the cards. **It now seems open–in spades.** The evidence, while not ironclad, is plentiful. Neta Bahcall of Princeton University and her colleagues have found that the distribution of clusters of galaxies at the perceivable edge of the universe imply [sic] that the universe back then was lighter than often had been believed. There appears to be 20 percent as much mass as would be needed to stop the expansion and lead the universe to someday collapse again (124[2]:58, emp. added).

Apparently, the information that appeared in the June 25, 2001 *Time* article was "ironclad," and dealt the ultimate death blow to the idea of either an eternal or oscillating Universe. In speaking about the origin of the Universe, Lemonick explained:

> That event–the literal birth of time and space some 15 billion years ago–has been understood, at least in its broadest outlines, since the 1960s. But in more than a third of a century, the best minds in astronomy have failed to solve the mystery of what happens at the other end of time. Will the galaxies continue to fly apart forever, their glow fading until the cosmos is cold and dark? Or will the expansion slow to a halt, reverse direction, and send 10 octillion (10 trillion billion) stars crashing back together in a final, apocalyptic Big Crunch, the mirror image of the universe's explosive birth? Despite decades of observations with the most powerful telescopes at their disposal, astronomers simply haven't been able to decide.
>
> But a series of remarkable discoveries announced in quick succession starting this spring has gone a long way toward settling the question once and for all. Sci-

> entists who were betting on a Big Crunch liked to quote the poet Robert Frost: "Some say the world will end in fire,/some say in ice./From what I've tasted of desire/I hold with those who favor fire." Those in the other camp preferred T.S. Eliot: "This is the way the world ends./Not with a bang but a whimper." Now, using observations from the Sloan Digital Sky Survey in New Mexico, the orbiting Hubble Space Telescope, the mammoth Keck Telescope in Hawaii, and sensitive radio detectors in Antarctica, the verdict is in: T.S. Eliot wins (157[25]:49-50).

What, exactly, has caused this current furor in astronomy? And why are T.S. Eliot and the astronomers who quote him the "winners"? As Lemonick went on to explain:

> If these observations continue to hold up, astrophysicists can be pretty sure they have assembled the full parts list for the cosmos at last: 5% ordinary matter, 35% exotic dark matter and about 60% dark energy. They also have a pretty good idea of the universe's future. All the matter put together doesn't have enough gravity to stop the expansion; beyond that, the antigravity effect of dark energy is actually speeding up the expansion. And because the amount of dark energy will grow as space gets bigger, its effect will only increase (157[25]:55).

The simple fact is, the Universe just does not have enough matter, or enough gravity, for it to collapse back upon itself in a "Big Crunch." It is not "oscillating." It is not eternal. It had a beginning, and it will have an ending. As Jastrow observed: "About thirty years ago science solved the mystery of the birth and death of stars, and acquired new evidence that the Universe had a beginning.... Now both theory and observation pointed to an expanding Universe and a beginning in time" (1978, p. 105). Six pages later in *God and the Astronomers*, Dr. Jastrow concluded: "Now three lines of evidence—the motions of the galaxies, the laws of thermodynamics, the life story of the stars—

pointed to one conclusion; all indicated that the Universe had a beginning" (p. 111). Earlier in that same volume, he had written: "And concurrently there was a great deal of discussion about the fact that the second law of thermodynamics, applied to the Cosmos, indicates the Universe is running down like a clock. If it is running down, there must have been a time when it was fully wound up" (pp. 48-49).

It was becoming apparent that matter could not be eternal, because, as everyone knows (and as every knowledgeable scientist readily admits), eternal things do not run down. Furthermore, there was going to be an end at some point in the future. And eternal entities do not have either beginnings or endings. In 1929, Sir James Jeans, writing in his classic book *The Universe Around Us,* observed: "All this makes it clear that the present matter of the universe cannot have existed forever.... In some way matter which had not previously existed, came, or was brought, into being" (1929, p. 316). Now, over seventy years later we have returned to the same conclusion. As Lemonick put it:

> If the latest results do hold up, some of the most important questions in cosmology—how old the universe is, what it's made of and how it will end—will have been answered, only about 70 years after they were first posed. By the time the **final chapter of cosmic history** is written—further in the future than our minds can grasp—humanity, and perhaps even biology, will long since have vanished (157[25]:56, emp. added).

The fact that *Time* magazine devoted an entire cover (and feature story to go with it) to the topic of "How the Universe Will End," and the reference to the "final chapter of cosmic history," are inadvertent admissions to something that evolutionists have long tried to avoid—the fact that the Universe had a beginning, and will have an ending. When one hears Sir James Jeans allude to the fact that "in some way matter which had not previously existed, came, or was brought, into being,"

the question that comes to mind is: **Who** brought it into being? As Great Britain's most eminent physicist, Stephen Hawking, once remarked: "The odds against a universe like ours emerging out of something like the big bang are enormous. **I think there are clearly religious implications**" (as quoted in Boslough, 1985, p. 121, emp. added). I certainly agree.

DID THE UNIVERSE CREATE ITSELF OUT OF NOTHING?

In the February 2001 issue of *Scientific American*, physicists Philip and Phylis Morrison wrote an article titled "The Big Bang: Wit or Wisdom?," in which they remarked: "We no longer see a big bang as a direct solution" (284[2]:95). It's no wonder. As Andrei Linde also wrote in *Scientific American* (seven years earlier) about the supporting evidences for the Big Bang: "We found many to be highly suspicious" (1994, 271[5]:48).

Dr. Linde's comments caught no one by surprise–and drew no ire from his colleagues. In fact, long before he committed to print in such a prestigious science journal the Big Bang's obituary, cosmologists had known (though they were not exactly happy at the thought of having to admit it publicly) that the Big Bang was, to employ a phrase I used earlier, "scientifically brain dead."

But it was because of that very fact that evolutionists had been working so diligently to find some way to "tweak" the Big Bang model so as to possibly revive it. As Berlinski rightly remarked:

> Notwithstanding the investment made by the scientific community and the general public in contemporary cosmology, a suspicion lingers that matters do not sum up as they should. Cosmologists write as if they are quite certain of the Big Bang, yet, within the last decade, they have found it necessary to augment the standard view by means of various new theories.

> These schemes are meant to solve problems that cosmologists were never at pains to acknowledge, so that today they are somewhat in the position of a physician reporting both that his patient has not been ill and that he has been successfully revived (1998, p. 30).

Scientists are desperately in search for an answer that will allow them to continue to defend at least some form of the Big Bang Model. Berlinski went on to note:

> Almost all cosmologists have a favored scheme; when not advancing their own, they occupy themselves enumerating the deficiencies of the others…. **Having constructed an elaborate scientific orthodoxy, cosmologists have acquired a vested interest in its defense**…. Like Darwin's theory of evolution, Big Bang cosmology has undergone that curious social process in which a scientific theory has been promoted to a secular myth (pp. 31-32,33,38, emp. added).

Enter inflationary theory—and the idea of (gulp!) a self-created Universe. In the past, it would have been practically impossible to find **any** reputable scientist who would have been willing to advocate a self-created Universe. To hold such a view would have been professional suicide. George Davis, a prominent physicist of the past generation, explained why when he wrote: "No material thing can create itself." Further, as Dr. Davis took pains to explain, such a statement "cannot be logically attacked on the basis of any knowledge available to us" (1958, p. 71). The Universe is the created, not the Creator. And until fairly recently, it seemed there could be no disagreement about that fact.

But, once again, "that was then; this is now." Because the standard Big Bang model is in such dire straits, and because the evidence is so conclusive that the Universe had some kind of beginning, evolutionists now are actually suggesting that **something came from nothing**—that is, **the Universe literally created itself from nothing**! Edward P. Tryon, pro-

fessor of physics at the City University of New York, was one of the first to suggest such an outlandish hypothesis: "In 1973," he said, "**I proposed that our Universe had been created spontaneously from nothing**, as a result of established principles of physics. This proposal variously struck people as preposterous, enchanting, or both" (1984, 101:14-16, emp. added). This is the same Edward P. Tryon who is on record as stating: "Our universe is simply one of those things which happen from time to time" (1973, 246:397). Anthony Kenny, a well-known British evolutionist, suggested in his book, *Five Ways of Thomas Aquinas*, that something actually came from nothing (1980).

In 1981, physicist Alan Guth of MIT had published a paper titled "Inflationary Universe: A Possible Solution to the Horizon and Flatness Problems," in which he outlined the specifics of inflationary theory (see Guth, 1981). Three years later, the idea that the Universe had simply "popped into existence from nothing," took flight when, in the May 1984 issue of *Scientific American*, Guth teamed up with physicist Paul Steinhardt of Princeton to co-author an article titled "The Inflationary Universe," in which they suggested:

> From a historical point of view probably the most revolutionary aspect of the inflationary model is the notion that all the matter and energy in the observable universe may have emerged from almost nothing.... The inflationary model of the universe provides a possible mechanism by which the observed universe could have evolved from an infinitesimal region. **It is then tempting to go one step further and speculate that the entire universe evolved from literally nothing** (1984, 250:128, emp. added).

Therefore, even though principles of physics that "cannot be logically attacked on the basis of any knowledge available to us" precluded the creation of something out of nothing, suddenly, in an eleventh-hour effort to resurrect the coma-

tose Big Bang Theory, it was suggested that indeed, the Universe simply had "created itself out of nothing." As physicist John Gribbin wrote (in an article for *New Scientist* titled "Cosmologists Move Beyond the Big Bang") two years after Guth and Steinhardt offered their proposal: "...new models are based on the concept that particles [of matter–BT] can be created out of nothing at all...under certain conditions" and that "...matter might suddenly appear in large quantities" (1986, 110[1511]: 30).

Naturally, such a proposal would seem–to use Dr. Tryon's words–"preposterous." [G.K. Chesterton once wrote: "It is absurd for the evolutionist to complain that it is unthinkable for an admittedly unthinkable God to make everything out of nothing, and then pretend that it is **more** thinkable that nothing should turn itself into everything" (as quoted in Marlin, et al., 1986, p. 113, emp. in orig.).] Be that as it may, some in the evolutionary camp were ready and willing to defend it–practically from the day it was suggested. One such scientist was Victor J. Stenger, professor of physics at the University of Hawaii. A mere three years after Guth and Steinhardt had published their volley in *Scientific American*, Dr. Stenger authored an article titled "Was the Universe Created?," in which he said:

> ...the universe is probably the result of a random quantum fluctuation in a spaceless, timeless void.... So what had to happen to start the universe was the formation of an empty bubble of highly curved space-time. How did this bubble form? What *caused* it? Not everything requires a cause. It could have just happened spontaneously as one of the many linear combinations of universes that has the quantum numbers of the void.... Much is still in the speculative stage, and **I must admit that there are yet no empirical or observational tests that can be used to test the idea of an accidental origin** (1987, 7[3]:26-30, italics in orig., emp. added.).

Not surprisingly, such a concept has met with serious opposition from within the scientific establishment. For example, in the summer 1994 edition of the *Skeptical Inquirer*, Ralph Estling wrote a stinging rebuke of the idea that the Universe created itself out of nothing. In his article, curiously titled, "The Scalp-Tinglin', Mind-Blowin', Eye-Poppin', Heart-Wrenchin', Stomach-Churnin', Foot-Stumpin', Great Big Doodley Science Show!!!," Estling wrote:

> The problem emerges in science when scientists leave the realm of science and enter that of philosophy and metaphysics, too often grandiose names for mere personal opinion, untrammeled by empirical evidence or logical analysis, and wearing the mask of deep wisdom.
>
> And so they conjure us an entire Cosmos, or myriads of cosmoses, suddenly, inexplicably, causelessly leaping into being out of—out of Nothing Whatsoever, for no reason at all, and thereafter expanding faster than light into more Nothing Whatsoever. And so cosmologists have given us Creation *ex nihilo*.... And at the instant of this Creation, they inform us, almost parenthetically, the universe possessed the interesting attributes of Infinite Temperature, Infinite Density, and Infinitesimal Volume, a rather gripping state of affairs, as well as something of a sudden and dramatic change from Nothing Whatsoever. They then intone equations and other ritual mathematical formulae and look upon it and pronounce it good.
>
> I do not think that what these cosmologists, these quantum theorists, these universe-makers, are doing is science. I can't help feeling that universes are notoriously disinclined to spring into being, ready-made, out of nothing. Even if Edward Tryon (ah, a name at last!) has written that "our universe is simply one of those things which happen from time to time...." Perhaps, although we have the word of many famous scientists

> for it, our universe is **not** simply one of those things that happen from time to time (1994, 18[4]:430, parenthetical comment in orig., emp. added).

Estling's statements set off a wave of controversy, as was evident from subsequent letters to the *Skeptical Inquirer*. In the January/February 1995 edition of that journal, numerous letters were published, discussing Estling's article. Estling's response to his critics was published as well, and included the following observations:

> All things begin with speculation, science not excluded. But if no empirical evidence is eventually forthcoming, or can be forthcoming, all speculation is barren.... **There is no evidence, so far, that the entire universe, observable and unobservable, emerged from a state of absolute Nothingness**. Quantum cosmologists insist both on this absolute Nothingness and on endowing it with various qualities and characteristics: this particular Nothingness possesses virtual quanta seething in a false vacuum. Quanta, virtual or actual, false or true, are not Nothing, they are definitely Something, although we may argue over what exactly. For one thing, quanta are entities having energy, a vacuum has energy and moreover, extension, i.e., it is something into which other things, such as universes, can be put, i.e., we cannot have our absolute Nothingness and eat it too. If we have quanta and a vacuum as given, we in fact have a pre-existent state of existence that either preexisted timelessly or brought itself into existence from absolute Nothingness (no quanta, no vacuum, no preexisting initial conditions) at some precise moment in time; it creates this time, along with the space, matter, and energy, which we call the universe.... I've had correspondence with Paul Davies [the British astronomer who has championed the idea that the Universe created itself from nothing–BT] on cosmologi-

> cal theory, in the course of which I asked him what he meant by "Nothing." He wrote back that he had asked Alexander Vilenkin what he meant by it and that Vilenkin had replied, "By Nothing I mean Nothing," which seemed pretty straightforward at the time, but these quantum cosmologists go on from there to tell us what their particular breed of Nothing consists of. I pointed this out to Davies, who replied that these things are very complicated. I'm willing to admit the truth of that statement, but I think **it does not solve the problem** (1995, 19[1]:69-70, parenthetical item in orig., emp. added).

This is an interesting turn of events. Evolutionists like Tryon, Stenger, Guth, and Steinhardt insist that this marvelously intricate Universe is "simply one of those things which happen from time to time" as the result of a "random quantum fluctuation in a spaceless, timeless void" that caused matter to evolve from "literally nothing." Such a suggestion, of course, would seem to be a clear violation of the first law of thermodynamics, which states that neither matter nor energy may be created or destroyed in nature. Berlinski acknowledged this when he wrote:

> Hot Big Bang cosmology appears to be in violation of the first law of thermodynamics. The global energy needed to run the universe has come from nowhere, and to nowhere it apparently goes as the universe loses energy by cooling itself.
>
> This contravention of thermodynamics expresses, in physical form, a general philosophical anxiety. Having brought space and time into existence, along with everything else, the Big Bang itself remains outside any causal scheme (1998, p. 37).

But, as one might expect, supporters of inflation have come up with a response to that complaint, too. In discussing the Big Bang, Linde wrote in *Scientific American*:

> In its standard form, the big bang theory maintains that the universe was born about 15 billion years ago from a cosmological singularity—a state in which the temperature and density are infinitely high. Of course, one cannot really speak in physical terms about these quantities as being infinite. **One usually assumes that the current laws of physics did not apply then** (1994, 271[5]:48, emp. added).

Linde is not the only one willing to acknowledge what the essence of Big-Bang-type scenarios does to the basic laws of physics. Astronomer Joseph Silk wrote:

> The universe began at time zero in a state of infinite density. Of course, the phrase "a state of infinite density" is completely unacceptable as a physical description of the universe…. **An infinitely dense universe [is] where the laws of physics, and even space and time, break down** (as quoted in Berlinski, 1998, p. 36).

But there are other equally serious problems as well. According to Guth, Steinhardt, Linde, and other evolutionary cosmologists, before the inflationary Big Bang, there was—well, **nothing**. Berlinski concluded: "But really the question of how the show started answers itself: before the Big Bang there was nothing" (p. 30). Or, as Terry Pratchett wrote in *Lords and Ladies*: "The current state of knowledge can be summarized thus: In the beginning there was nothing, which exploded" (1994, p. 7). Think about that for just a moment. Berlinski did, and then wrote:

> The creation of the universe remains unexplained by any force, field, power, potency, influence, or instrumentality known to physics—or to man. **The whole vast imposing structure organizes itself from absolutely nothing. This is not simply difficult to grasp. It is incomprehensible**.
>
> Physicists, no less than anyone else, are uneasy with the idea that the universe simply popped into existence, with space and time "suddenly switching them-

> selves on." The image of a light switch comes from Paul Davies, who uses it to express a miracle without quite recognizing that it embodies a contradiction. **A universe that has suddenly switched itself on has accomplished something within time; and yet the Big Bang is supposed to have brought space and time into existence**.
>
> Having entered a dark logical defile, physicists often find it difficult to withdraw. Thus, Alan Guth writes in pleased astonishment that the universe really did arise from "essentially…nothing at all": "as it happens, a false vacuum patch" "[10^{-26}] centimeters in diameter" and "[10^{-32}] solar masses." **It would appear, then, that "essentially nothing" has both spatial extension and mass. While these facts may strike Guth as inconspicuous, others may suspect that nothingness, like death, is not a matter that admits of degrees** (p. 37, emp. added).

And, in their more unguarded moments, physicists and astronomers admit as much. Writing in *Astronomy* magazine on "Planting Primordial Seeds," Rocky Kolb suggested: "In a very real sense, quantum fluctuations would be the origin of everything we see in the universe." Yet just one sentence prior to that, he had admitted: "...**[A] region of seemingly empty space is not really empty, but is a seething froth** in which every sort of fundamental particle pops in and out of empty space before annihilating with its antiparticle and disappearing" (1998, 26[2]:42,43, emp. added). Jonathan Sarfati commented:

> Some physicists assert that quantum mechanics violates this cause/effect principle and can produce something from nothing.... But this is a gross misapplication of quantum mechanics. **Quantum mechanics never produces something out of nothing**.... Theories that the Universe is a quantum fluctuation must presuppose that there was something to fluctuate—

their "quantum vacuum" is a lot of matter-antimatter potential–not "nothing" (1998, 12[1]:21, emp. added).

Furthermore, as Kitty Ferguson has noted:

> Suppose it all began with a vacuum where space-time was empty and flat. The uncertainty principle doesn't allow an emptiness of complete zero.... In complete emptiness, the two measurements would read exactly zero simultaneously–zero value, zero rate of change–both very precise measurements. The uncertainty principle doesn't allow both measurements to be that definite at the same time, and therefore, as most physicists currently interpret the uncertainty principle, zero for both values simultaneously is out of the question. **Nothingness is forced to read–something**. If we can't have nothingness at the beginning of the universe, what do we have instead?...
>
> The "cosmological constant" is one of the values that seem to require fine-tuning at the beginning of the universe. You may recall from Chapter 4 that Einstein theorized about something called the "cosmological constant" which would offset the action of gravity in his theory, allowing the universe to remain static. Physicists now use the term to refer to the energy density of the vacuum. Common sense says there shouldn't be any energy in a vacuum at all, but as we saw in Chapter 4, **the uncertainty principle doesn't allow empty space to be empty**....
>
> Just as the uncertainty principle rules out the possibility of measuring simultaneously the precise momentum and the precise position of a particle, it also rules out the possibility of measuring simultaneously the value of a field and the rate at which that field is changing over time. The more precisely we try to measure one, the fuzzier the other measurement becomes. Zero is a very precise measurement, and measurement of two zeros simultaneously is therefore out of the question. Instead of empty space, there is a con-

> tinuous fluctuation in the value of all fields, a wobbling a bit toward the positive and negative sides of zero so as not to *be* zero. **The upshot is that empty space instead of being empty must teem with energy** (1994, p. 171, italics in orig., emp. added).

Ultimately, the Guth/Steinhardt inflationary model was shown to be incorrect, and a newer version was suggested. Working independently, Russian physicist Andrei Linde, and American physicists Andreas Albrecht and Paul Steinhardt, developed the "new inflationary model" (see Hawking, 1988, pp. 131-132). However, this model also was shown to be incorrect, and was discarded. Renowned British astrophysicist Stephen W. Hawking put the matter in proper perspective when he wrote:

> The new inflationary model was a good attempt to explain why the universe is the way it is.... In my personal opinion, **the new inflationary model is now dead as a scientific theory**, although a lot of people do not seem to have heard of its demise and are still writing papers on it as if it were viable (1988, p. 132, emp. added).

Later, Linde himself suggested numerous modifications, and is credited with producing what became known as the "chaotic inflationary model" (see Hawking, pp. 132ff.). Dr. Hawking performed additional work on this particular model as well. But in an interview on June 8, 1994 dealing specifically with inflationary models, Alan Guth conceded:

> First of all, I will say that at the purely technical level, inflation itself does not explain how the universe arose from nothing.... Inflation itself takes a very small universe and produces from it a very big universe. But inflation by itself does not explain where that very small universe came from (as quoted in Heeren, 1995, p. 148).

After the chaotic inflationary model, came the eternal inflationary model, which was set forth by Andrei Linde in 1986. As astronomer John D. Barrow summarized it in his work, *The Book of Nothing:*

> The spectacular effect of this is to make inflation self-reproducing. Every inflating region gives rise to other sub-regions which inflate and then in turn do the same. The process appears unstoppable–eternal. No reason has been found why it should ever end. Nor is it known if it needs to have a beginning. As with the process of chaotic inflation, every bout of inflation can produce a large region with very different properties. Some regions may inflate a lot, some only a little; some may have many large dimensions of space, some only three; some may contain four forces of Nature that we see, others may have fewer. The overall effect is to provide a physical mechanism by which to realize all, or at least almost all, possibilities somewhere within a single universe.
>
> These speculative possibilities show some of the unending richness of the physicists' conception of the vacuum. It is the basis of our most successful theory of the Universe and why it has the properties that it does. Vacuums can change; vacuums can fluctuate; vacuums can have strange symmetries, strange geographies, strange histories. More and more of the remarkable features of the Universe we observe seem to be reflections of the properties of the vacuum (2000, pp. 256,271).

Michael J. Murray discussed the idea of the origin of the Universe via the Big Bang inflationary model.

> According to the vacuum fluctuation models, our universe, along with these others universes, were generated by quantum fluctuations in a preexisting superspace. Imaginatively, one can think of this preexisting superspace as an infinitely extending ocean of

> soap, and each universe generated out of this superspace as a soap bubble which spontaneously forms on the ocean (1999, pp. 59-60).

Magnificent claims, to be sure–yet little more than wishful thinking. For example, cosmologists speak of a particular particle–known as an "inflaton"–that is supposed to have provided the vacuum with its initial energy. Yet as scientists acknowledge, "...the particle that might have provided the vacuum energy density is still unidentified, even theoretically; it is sometimes called the inflaton because its sole purpose seems to be to have produced inflation" (see "The Inflationary Universe," 2001). In an article on "Before the Big Bang" in the March 1999 issue of *Analog Science Fiction & Fact Magazine*, John G. Cramer wrote:

> The problem with all of this is that the inflation scenario seems rather contrived and raises many unresolved questions. Why is the universe created with the inflaton field displaced from equilibrium? Why is the displacement the same everywhere? What are the initial conditions that produce inflation? How can the inflationary phase be made to last long enough to produce our universe? Thus, the inflation scenario which was invented to eliminate the contrived initial conditions of the Big Bang model apparently needs contrived initial conditions of its own (1999).

Cosmologist Michael Turner of the University of Chicago put it this way: "If inflation is the dynamite behind the Big Bang, we're still looking for the match" (as quoted in Overbye, 2001). Or, as journalist Dennis Overbye put it in an article titled "Before the Big Bang, There Was…What?" in the May 22, 2001 issue of *The New York Times*: "The only thing that all the experts agree on is that no idea works–yet" (2001). As Barrow admitted somewhat sorrowfully: "So far, unfortunately, **the entire grand scheme of eternal inflation does not appear to be open to observational tests**" (p. 256, emp. added). In *The Accelerating Universe,* Mario Livio wrote in agreement:

> If eternal inflation really describes the evolution of the universe, then the beginning may be entirely inaccessible to observational tests. The point is that even the original inflationary model, with a single inflation event, already had the property of erasing evidence from the preinflation epoch. **Eternal inflation appears to make any efforts to obtain information about the beginning, via observations in our own pocket universe, absolutely hopeless** (2000, pp 180-181, emp. added).

Writing in the February 2001 issue of *Scientific American*, physicists Philip and Phylis Morrison admitted:

> We simply do not know our cosmic origins; intriguing alternatives abound, but none yet compels. We do not know the details of inflation, nor what came before, nor the nature of the dark, unseen material, nor the nature of the repulsive forces that dilute gravity. The book of the cosmos is still open. Note carefully: **we no longer see a big bang as a direct solution. Inflation erases evidence of past space, time and matter.** The beginning–if any–is still unread (284[2]:93,95, emp. added).

But Dr. Barrow went even farther when he noted:

> As the implications of the quantum picture of matter were explored more fully, a further radically new consequence appears that was to impinge upon the concept of the vacuum. Werner Heisenberg showed that there were complementary pairs of attributes of things which could not be measured simultaneously with arbitrary precision, even with perfect instruments. This restriction on measurement became known as the Uncertainty Principle. One pair of complementary attributes limited by the Uncertainty Principle is the combination of position and momentum. Thus we cannot know at once where something is **and** how it is moving with arbitrary precision....

> The Uncertainty Principle and the quantum theory revolutionised our conception of the vacuum. **We can no longer sustain the simple idea that a vacuum is just an empty box**. If we could say that there were no particles in a box, that it was completely empty of all mass and energy, then we would have to violate the Uncertainty Principle because we would require perfect information about motion at every point and about the energy of the system at a given instant of time....
>
> This discovery at the heart of the quantum description of matter means that the concept of a vacuum must be somewhat realigned. **It is no longer to be associated with the idea of the void and of nothingness or empty space. Rather, it is merely the emptiest possible state in the sense of the state that possesses the lowest possible energy; the state from which no further energy can be removed** (2000, pp. 204,205, first emp. in orig.; last emp. added).

The simple fact is, to quote R.C. Sproul:

> Every **effect** must have a **cause**. That is true by definition. ...It is impossible for something to create itself. The concept of self-creation is a contradiction in terms, a nonsense statement.... [S]elf-creation is irrational (1992, p. 37, emp. in orig.).

Stephen Hawking was constrained to write:

> Even if there is only one possible unified theory, it is just a set of rules and equations. What is it that breathes fire into the equations and makes a universe for them to describe? The usual approach of science of constructing a mathematical model cannot answer the question of why there should be a universe for the model to describe (1988, p. 174).

Linde himself–as the developer of the eternal inflation model–admitted that there is a chicken-and-egg problem involved here. Which came first–the Universe, or the laws governing

it? He asked: "If there was no law, then how did the Universe appear?" (as quoted in Overbye, 2001). It is refreshing indeed to see that scientists of Dr. Linde's stature are willing to ask such questions.

In a chapter titled "Science and the Unknowable" in one of his books, renowned humanist author Martin Gardner followed Hawking's and Linde's lead when he wrote:

> Imagine that physicists finally discover all the basic waves and their particles, and all the basic laws, and unite everything in one equation. We can then ask, "Why that equation?" It is fashionable now to conjecture that the big bang was caused by a random quantum fluctuation in a vacuum devoid of space and time. **But of course such a vacuum is a far cry from nothing. There had to be quantum laws to fluctuate. And why are there quantum laws?**… There is no escape from the superultimate questions: Why is there something rather than nothing, and why is the something structured the way it is? (2000, p. 303, emp. added).

Barrow commented in a similar fashion when he wrote:

> **At first, the absence of a beginning appears to be an advantage to the scientific approach. There are no awkward starting conditions to deduce or explain. But this is an illusion. We still have to explain why the Universe took on particular properties**—its rate expansion, density, and so forth—at an infinite time in the past (2000, p. 296, emp. added).

Gardner and Barrow are correct. And science cannot provide the answer. Nancey Murphy and George Ellis discussed this very point in their book, *On the Moral Nature of the Universe*:

> Hence, we note the fundamental major metaphysical issues that purely scientific cosmology by itself cannot tackle–the problem of existence (what is the ultimate origin of physical reality?) and the origin and determination of the specific nature of physical laws–for these all lie outside the domain of scientific investigation. The basic reason is that there is no way that any of these issues can be addressed experimentally. The experimental method can be used to test existing physical laws but not to examine why those laws are in existence. One can investigate these issues using the hypothetico-deductive method, but one cannot then conduct physical, chemical, or biological experiments or observations that will confirm or disconfirm the proposed hypotheses (1996, p. 61).

Furthermore, science is based on observation, reproducibility, and empirical data. But when pressed for the empirical data that document the claim that the Universe created itself from nothing, evolutionists are forced to admit, as Dr. Stenger did, that "...there are yet no empirical or observational tests that can be used to test the idea...." Estling summarized the problem quite well when he stated: "There is no evidence, so far, that the entire universe, observable and unobservable, emerged from a state of absolute Nothingness" (1995, 19[1]: 69-70). Again, I agree.

WAS THE UNIVERSE CREATED?

The Universe is not eternal. Nor did it create itself. It therefore must have been created. And such a creation most definitely implies a Creator.

Is the Universe the result of creation by an eternal Creator? Either the Universe had a beginning, or it had no beginning. But all available evidence asserts that the Universe did have a beginning. If the Universe had a beginning, it either had a cause, or it did not have a cause. One thing we know: it is cor-

rect–both scientifically and philosophically–to acknowledge that the Universe had an adequate cause, because the Universe is an effect, and as such requires an adequate antecedent cause. Nothing causeless happens. Henry Morris was correct when he suggested that the Law of Cause and Effect is "universally accepted and followed in every field of science" (1974, p. 19). The cause/effect principle states that wherever there is a material **effect**, there must be an adequate antecedent **cause**. Further indicated, however, is the fact that no effect can be qualitatively superior to, or quantitatively greater than, its cause.

Since it is apparent that the Universe is not eternal, and since it likewise is apparent that the Universe could not have created itself, the only remaining alternative is that the Universe **was created** by something (or Someone): (a) that existed before it, i.e., some eternal, uncaused First Cause; (b) superior to it–the created cannot be superior to the creator; and (c) of a different nature since the finite, dependent Universe of matter is unable to explain itself. As Hoyle and Wickramasinghe observed: "To be consistent logically, we have to say that the intelligence which assembled the enzymes did not itself contain them" (1981, p. 139).

In connection with this, another fact should be considered. If there ever had been a time when absolutely **nothing** existed, then there would be nothing now. It is a self-evident truth that nothing produces nothing. In view of this, **since something does exist, it must follow logically that something has existed forever**! Everything that exists can be classified as either **matter** or **mind**. There is no third alternative. The argument then, is this:

1. Everything that exists is either matter or mind.
2. Something exists now, so something eternal exists.
3. Therefore, either matter or mind is eternal.

A. Either matter or mind is eternal.
B. Matter is not eternal, per the evidence cited above.
C. Thus, it is mind that is eternal.

Or, to reason somewhat differently:

1. Everything that is, is either dependent (i.e., contingent) or independent (non-contingent).
2. If the Universe is not eternal, it is dependent(contingent).
3. The Universe is not eternal.
4. Therefore, the Universe is dependent (contingent).

A. If the Universe is dependent, it must have been caused by something that is independent.
B. But the Universe is dependent (contingent).
C. Therefore, the Universe was produced by some eternal, independent (non-contingent) force.

In the past, atheistic evolutionists suggested that the mind is nothing more than a function of the brain, which is matter; thus, the mind and the brain are the same, and matter is all that exists. As the late evolutionist Carl Sagan said in the opening sentence of his television extravaganza (and book by the same name), *Cosmos*, "The Cosmos is all that is or ever was or ever will be" (1980, p. 4). However, that viewpoint no longer is credible scientifically, due in large part to the experiments of Australian physiologist Sir John Eccles. Dr. Eccles, who won in 1963 Nobel Prize in Physiology or Medicine for his discoveries relating to the neural synapses within the brain, documented that the mind is more than merely physical. He showed that the supplementary motor area of the brain may be fired by mere **intention** to do something, without the motor cortex (which controls muscle movements) operating. In effect, the mind is to the brain what a librarian is to a library. The former is not reducible to the latter. Eccles explained his methodology and conclusions in *The Self and Its Brain*, co-authored with the renowned philosopher of science, Sir Karl Popper (see Popper and Eccles, 1977).

Anyone familiar with neurophysiology or neurobiology knows the name of Sir John Eccles. But for those who might not be familiar with this amazing gentleman, I would like to introduce Dr. Eccles via the following quotation, which comes from a chapter ("The Collapse of Modern Atheism") that philosopher Norman Geisler authored for the book, *The Intellectuals Speak Out About God* (which also contained a chapter by Eccles, from which I will quote shortly). Geisler wrote:

> The extreme form of materialism believes that mind (or soul) *is* matter. More modern forms believe mind is *reducible to* matter or *dependent on* it. **However, from a scientific perspective much has happened in our generation to lay bare the clay feet of materialism. Most noteworthy among this is the Nobel Prize winning work of Sir John Eccles. His work on the brain demonstrated that the mind or intention is more than physical. He has shown that the supplementary motor area of the brain is fired by mere *intention* to do something, without the motor cortex of the brain (which controls muscle movements) operating**. So, in effect, the mind is to the brain what an archivist is to a library. The former is not reducible to the latter (1984, pp. 140-141, parenthetical item and italics in orig., emp. added).

Eccles and Popper viewed the mind as a distinctly nonmaterial entity. But neither did so for religious reasons, since both were committed Darwinian evolutionists. Rather, they believed what they did about the human mind because of their research! Eccles spent his entire adult life studying the brain-mind problem, and concluded that the two were entirely separate. In a fascinating book, *Nobel Conversations,* Norman Cousins, who moderated a series of conversations among four Nobel laureates, including Dr. Eccles, made the following statement: "Nor was Sir John Eccles claiming too much when **he insisted that the action of non-material mind on**

material brain has been not merely postulated but scientifically demonstrated" (1985, p. 68, emp. added). Eccles himself, in his book, *The Understanding of the Brain*, wrote:

> When I postulated many years ago, following Sherrington [Sir Charles Sherrington, Nobel laureate and Eccles' mentor–BT], that there was a special area of the brain in liaison with consciousness, I certainly did not imagine that any definitive experimental test could be applied in a few years. But now we have this distinction between the dominant hemisphere in liaison with the conscious self, and the minor hemisphere with no such liaison (1973, p. 214).

In an article–"Scientists in Search of the Soul"–that examined the groundbreaking work of Dr. Eccles (and other scientists like him who have been studying the mind/brain relationship), science writer John Gliedman wrote:

> At age 79, Sir John Eccles is not going "gentle into the night." Still trim and vigorous, the great physiologist has declared war on the past 300 years of scientific speculation about man's nature.
>
> Winner of the 1963 Nobel Prize in Physiology or Medicine for his pioneering research on the synapse–the point at which nerve cells communicate with the brain–Eccles strongly defends the ancient religious belief that human beings consist of a mysterious compound of physical and intangible spirit.
>
> Each of us embodies a nonmaterial thinking and perceiving self that "entered" our physical brain sometime during embryological development or very early childhood, says the man who helped lay the cornerstones of modern neurophysiology. This "ghost in the machine" is responsible for everything that makes us distinctly human: conscious self-awareness, free will, personal identity, creativity and even emotions such as love, fear, and hate. Our nonmaterial self controls its "liaison brain" the way a driver steers a car or

> a programmer directs a computer. Man's ghostly spiritual presence, says Eccles, exerts just the whisper of a physical influence on the computerlike brain, enough to encourage some neurons to fire and others to remain silent. Boldly advancing what for most scientists is the greatest heresy of all, Eccles also asserts that our nonmaterial self survives the death of the physical brain (1982, 90[7]:77).

While discussing the same type of conclusions reached by Dr. Eccles, philosopher Norman Geisler explored the concept of an eternal, all-knowing Mind.

> Further, this infinite cause of all that is must be all-knowing. It must be knowing because knowing beings exist. I am a knowing being, and I know it. I cannot meaningfully deny that I can know without engaging in an act of knowledge.... But a cause can communicate to its effect only what it has to communicate. If the effect actually possesses some characteristic, then this characteristic is properly attributed to its cause. The cause cannot give what it does not have to give. If my mind or ability to know is received, then there must be Mind or Knower who gave it to me. The intellectual does not arise from the nonintellectual; something cannot arise from nothing. The cause of knowing, however, is infinite. Therefore it must know infinitely. It is also simple, eternal, and unchanging. Hence, whatever it knows–and it knows anything it is possible to know–it must know simply, eternally, and in an unchanging way (1976, p. 247).

From such evidence, Robert Jastrow concluded: "That there are what I or anyone would call supernatural forces at work is now, I think, a scientifically proven fact..." (1982, p. 18). Apparently Dr. Jastrow is not alone. As Gliedman put it:

> Eccles is not the only world-famous scientist taking a controversial new look at the ancient mind-body conundrum. From Berkeley to Paris and from London

> to Princeton, prominent scientists from fields as diverse as neurophysiology and quantum physics are coming out of the closet and admitting they believe in the possibility, at least, of such unscientific entities as the immortal human spirit and divine creation (90[7]:77).

In an article titled "Modern Biology and the Turn to Belief in God" that he wrote for the book, *The Intellectuals Speak Out About God*, Eccles concluded:

> Science and religion are very much alike. Both are imaginative and creative aspects of the human mind. The appearance of a conflict is a result of ignorance. **We come to exist through a divine act.** That divine guidance is a theme throughout our life; at our death the brain goes, but that divine guidance and love continues. Each of us is a unique, conscious being, a divine creation. **It is the religious view. It is the only view consistent with all the evidence** (1984, p. 50, emp. added).

And, once again, I agree.

Our Fine-Tuned, Tailor-Made Universe

And it is not just people who are unique (in the sense of exhibiting evidence of design). The fact is, the Universe is "fine-tuned" in such a way that it is impossible to suggest logically that it simply "popped into existence out of nothing" and then went from the chaos associated with the inflationary Big Bang model (as if the Universe were a giant firecracker!) to the sublime order that it presently exhibits. Murphy and Ellis went on to note:

> The symmetries and delicate balances we observe in the universe require an extraordinary coherence of conditions and cooperation of laws and effects, suggesting that in some sense they have been **purposely designed**. That is, **they give evidence of inten-**

> **tion**, realized both in the setting of the laws of physics and in the choice of boundary conditions for the universe (p. 57, emp. added).

In an article that appeared on *Nature's* August 13, 2002, online Science-Update ("Is Physics Watching Over Us?"), Philip Ball commented: "Our Universe is so unlikely that we must be missing something." One more time, I agree. For decades now, cosmologists have been attempting to conjure up theories regarding the origin of our Universe–all the while wearing "evolutionary blinders." It appears as though some (although, admittedly, not nearly enough) cosmologists finally are removing those blinders, and actually are beginning to come to terms with their own data.

As a part of his review, Mr. Ball commented on what was at the time an upcoming research report titled "Disturbing Implications of a Cosmological Constant" (see Dyson, et al., 2002). In referring to the work being carried out by a team of researchers headed by Leonard Susskind of Stanford University, Ball wrote:

> In an argument that would have gratified the ancient Greeks, physicists have claimed that the prevailing theoretical view of the Universe is logically flawed. Arranging the cosmos as we think it is arranged, says the team, **would have required a miracle**. The incomprehensibility of our situation even drives Susskind's team to ponder whether an "**unknown agent**" intervened in the evolution [of the Universe] for reasons of its own (2002, emp. added).

Or, as Idit Zehavi and Avishal Dekel wrote in *Nature*: "This type of universe, however, seems to require a degree of fine tuning of the initial conditions that is in apparent conflict with 'common wisdom'" (1999, 401:252).

The idea that the Universe and its laws "have been purposely designed" has surfaced much more frequently in the past several years. For example, Sir Fred Hoyle wrote:

> **A common sense interpretation of the facts suggests that a superintellect has monkeyed with physics, as well as with chemistry and biology**, and that there are no blind forces worth speaking about in nature. The numbers one calculates from the facts seem to me so overwhelming as to put this conclusion almost beyond question (1982, 20:16, emp. added).

In his book, *Superforce: The Search for a Grand Unified Theory of Nature*, Australian astrophysicist Paul Davies made this amazing statement:

> If nature is so "clever" as to exploit mechanisms that amaze us with their ingenuity, **is that not persuasive evidence for the existence of intelligent design behind the universe**? If the world's finest minds can unravel only with difficulty the deeper workings of nature, how could it be supposed that those workings are merely a mindless accident, a product of blind chance? (1984, pp. 235-236, emp. added).

Four years later, in his text, *The Cosmic Blueprint: New Discoveries in Nature's Creative Ability to Order the Universe*, Davies went even farther when he wrote:

> There is for me powerful evidence that there is something going on behind it all.... **It seems as though somebody has fine-tuned nature's numbers to make the Universe.... The impression of design is overwhelming** (1988, p. 203, emp. added).

Another four years later, in 1992, Davies authored *The Mind of God*, in which he remarked:

> I cannot believe that our existence in this universe is a mere quirk of fate, an accident of history, an incidental blip in the great cosmic drama.... Through conscious beings the universe has generated self-awareness. This can be no trivial detail, no minor by-product of mindless, purposeless forces. **We are truly meant to be here** (1992a, p. 232, emp. added).

That statement, "We are truly meant to be here," was the type of sentiment expressed by two scientists, Frank Tipler and John Barrow, in their 1986 book, *The Anthropic Cosmological Principle*, which discussed the possibility that the Universe seems to have been "tailor-made" for man. Eight years after that book was published, Dr. Tipler wrote *The Physics of Immortality*, in which he professed:

> When I began my career as a cosmologist some twenty years ago, I was a convinced atheist. I never in my wildest dreams imagined that one day I would be writing a book purporting to show that the central claims of Judeo-Christian theology are in fact true, that these claims are straightforward deductions of the laws of physics as we now understand them. I have been forced into these conclusions by the inexorable logic of my own special branch of physics (1994, Preface).

In 1995, NASA astronomer John O'Keefe stated in an interview: "We are, by astronomical standards, a pampered, cosseted, cherished group of creatures.... If the Universe had not been made with the most exacting precision we could never have come into existence. It is my view that these circumstances indicate the universe was created for man to live in" (as quoted in Heeren, 1995, p. 200). Then, thirteen years after he published his 1985 book (*Evolution: A Theory in Crisis*), Michael Denton shocked everyone–especially his evolutionist colleagues–when he published his 1998 tome, *Nature's Destiny*, in which he admitted:

> Whether one accepts or rejects the design hypothesis...there is no avoiding the conclusion that the world **looks** as if it has been tailored for life; it **appears to have been designed**. All reality **appears** to be a vast, coherent, teleological whole with life and mankind as its purpose and goal (p. 387, emp. in orig.).

In his discussion of the Big Bang inflationary model, Murray discussed the idea of the origin of the Universe and the complexity that would be required to pull off such an event.

> ...[I]n all current worked-out proposals for what this "universe generator" could be–such as the oscillating big bang and the vacuum fluctuation models explained above–the "generator" itself is governed by a complex set of physical laws that allow it to produce the universes. It stands to reason, therefore, that if these laws were slightly different the generator probably would not be able to produce any universes that could sustain life. After all, even my bread machine has to be made just right to work properly, and it only produces loaves of bread, not universes!
>
> ...[T]he universe generator must not only select the parameters of physics at random, but must actually randomly create or select the very laws of physics themselves. This makes this hypothesis seem even more far-fetched since it is difficult to see what possible physical mechanism could select or create such laws. The reason the "many-universes generator" must randomly select the laws of physics is that, just as the right values for the parameters of physics are needed for life to occur, the right set of laws is also needed. If, for instance, certain laws of physics were missing, life would be impossible. For example, without the law of inertia, which guarantees that particles do not shoot off at high speeds, life would probably not be possible. Another example is the law of gravity; if masses did not attract each other, there would be no planets or stars, and once again it seems that life would be impossible (1999, pp. 61-62).

Sir Fred Hoyle actually addressed the fine-tuning of the nuclear resonances responsible for the oxygen and carbon synthesis in stars when he observed:

> I do not believe that any scientists who examined the evidence would fail to draw the inference that **the laws of nuclear physics have been deliberately designed** with regard to the consequences they produce inside stars. If this is so, then my apparently random quirks have become part of a deep-laid scheme. If not, then we are back again at a **monstrous sequence of accidents** (1959, emp. added).

When we (to use Hoyle's words) "examine the evidence," what do we find? Stephen Hawking wrote: "If the rate of expansion one second after the big bang had been smaller by even one part in a hundred thousand million million, the universe would have recollapsed before it ever reached its present size" (1988, pp. 121-122). Murray noted:

> Almost **everything about the basic structure of the universe**–for example, the fundamental laws and parameters of physics and the initial distribution of matter and energy–**is balanced on a razor's edge** for life to occur.... Scientists call this extraordinary balancing of the parameters of physics and the initial conditions of the universe the "fine-tuning of the cosmos" (1999, p. 48, emp. added).

Indeed they do. And it is fine-tuning to a remarkable degree. Consider the following critically important parameters that must be fine-tuned (from an evolutionary perspective) in order for the Universe to exist, and for life to exist in the Universe.

1. Strong nuclear force constant:

> *if larger*: no hydrogen would form; atomic nuclei for most life-essential elements would be unstable; thus, no life chemistry;
>
> *if smaller*: no elements heavier than hydrogen would form: again, no life chemistry

2. **Weak nuclear force constant:**

   if larger: too much hydrogen would convert to helium in big bang; hence, stars would convert too much matter into heavy elements making life chemistry impossible;

   if smaller: too little helium would be produced from the big bang; hence, stars would convert too little matter into heavy elements making life chemistry impossible

3. **Gravitational force constant:**

   if larger: stars would be too hot and would burn too rapidly and too unevenly for life chemistry;

   if smaller: stars would be too cool to ignite nuclear fusion; thus, many of the elements needed for life chemistry would never form

4. **Electromagnetic force constant:**

   if greater: chemical bonding would be disrupted; elements more massive than boron would be unstable to fission;

   if lesser: chemical bonding would be insufficient for life chemistry

5. **Ratio of electromagnetic force constant to gravitational force constant:**

   if larger: all stars would be at least 40% more massive than the Sun; hence, stellar burning would be too brief and too uneven for life support;

   if smaller: all stars would be at least 20% less massive than the Sun, thus incapable of producing heavy elements

6. **Ratio of electron to proton mass:**

   if larger: chemical bonding would be insufficient for life chemistry;

   if smaller: same as above ratio of number of protons to number of electrons

7. **Ratio of number of protons to number of electrons:**

   if larger: electromagnetism would dominate gravity, preventing galaxy, star, and planet formation;

   if smaller: same as above

8. **Expansion rate of the Universe:**

   if larger: no galaxies would form

   if smaller: Universe would collapse, even before stars formed entropy level of the Universe

9. **Entropy level of the Universe:**

   if larger: stars would not form within proto-galaxies;

   if smaller: no proto-galaxies would form

10. **Mass density of the Universe:**

    if larger: overabundance of deuterium from big bang would cause stars to burn rapidly, too rapidly for life to form;

    if smaller: insufficient helium from big bang would result in a shortage of heavy elements

11. **Velocity of light:**

    if faster: stars would be too luminous for life support;

    if slower: stars would be insufficiently luminous for life support

12. **Initial uniformity of radiation:**

    if more uniform: stars, star clusters, and galaxies would not have formed;

    if less uniform: Universe by now would be mostly black holes and empty space

13. **Average distance between galaxies:**

    if larger: star formation late enough in the history of the Universe would be hampered by lack of material

    if smaller: gravitational tug-of-wars would destabilize the Sun's orbit

14. **Density of galaxy cluster:**

    if denser: galaxy collisions and mergers would disrupt the sun's orbit

    if less dense: star formation late enough in the history of the universe would be hampered by lack of material

15. **Average distance between stars:**

    if larger: heavy element density would be too sparse for rocky planets to form

    if smaller: planetary orbits would be too unstable for life

16. **Fine structure constant (describing the fine-structure splitting of spectral lines):**

    if larger: all stars would be at least 30% less massive than the Sun

    if larger than 0.06: matter would be unstable in large magnetic fields

    if smaller: all stars would be at least 80% more massive than the Sun

17. **Decay rate of protons:**

    if greater: life would be exterminated by the release of radiation

    if smaller: Universe would contain insufficient matter for life

18. **^{12}C to ^{16}O nuclear energy level ratio:**

    if larger: Universe would contain insufficient oxygen for life

    if smaller: Universe would contain insufficient carbon for life

19. **Ground state energy level for ^{4}He:**

    if larger: Universe would contain insufficient carbon and oxygen for life

    if smaller: same as above

20. **Decay rate of ^{8}Be:**

if slower: heavy element fusion would generate catastrophic explosions in all the stars

if faster: no element heavier than beryllium would form; thus, no life chemistry

21. **Ratio of neutron mass to proton mass:**

if higher: neutron decay would yield too few neutrons for the formation of many life-essential elements

if lower: neutron decay would produce so many neutrons as to collapse all stars into neutron stars or black holes

22. **Initial excess of nucleons over anti-nucleons:**

if greater: radiation would prohibit planet formation

if lesser: matter would be insufficient for galaxy or star formation

23. **Polarity of the water molecule:**

if greater: heat of fusion and vaporization would be too high for life

if smaller: heat of fusion and vaporization would be too low for life; liquid water would not work as a solvent for life chemistry; ice would not float, and a runaway freeze-up would result

24. **Supernovae eruptions:**

if too close, too frequent, or too late: radiation would exterminate life on the planet

if too distant, too infrequent, or too soon: heavy elements would be too sparse for rocky planets to form

25. **White dwarf binaries:**

if too few: insufficient fluorine would exist for life chemistry

if too many: planetary orbits would be too unstable for life

if formed too soon: insufficient fluorine production

if formed too late: fluorine would arrive too late for life chemistry

26. Ratio of exotic matter mass to ordinary matter mass:

if larger: universe would collapse before solar-type stars could form

if smaller: no galaxies would form

27. Number of effective dimensions in the early Universe:

if larger: quantum mechanics, gravity, and relativity could not coexist; thus, life would be impossible

if smaller: same result

28. Number of effective dimensions in the present Universe:

if smaller: electron, planet, and star orbits would become unstable

if larger: same result

29. Mass of the neutrino:

if smaller: galaxy clusters, galaxies, and stars would not form

if larger: galaxy clusters and galaxies would be too dense

30. Big bang ripples:

if smaller: galaxies would not form; Universe would expand too rapidly:

if larger: galaxies/galaxy clusters would be too dense for life; black holes would dominate; Universe would collapse before life-site could form

31. Size of the relativistic dilation factor:

if smaller: certain life-essential chemical reactions will not function properly

if larger: same result

32. **Uncertainty magnitude in the Heisenberg uncertainty principle:**

    if smaller: oxygen transport to body cells would be too small and certain life-essential elements would be unstable

    if larger: oxygen transport to body cells would be too great and certain life-essential elements would be unstable

33. **Cosmological constant:**

    if larger: Universe would expand too quickly to form solar-type stars (see: "Evidence for the Fine-Tuning of the Universe").

Consider also these additional fine-tuning examples:

Ratio of electrons to protons	$1{:}10^{37}$
Ratio of electromagnetic force to gravity	$1{:}10^{40}$
Expansion rate	$1{:}10^{55}$
Mass of Universe	$1{:}10^{59}$
Cosmological Constant (Lambda)	$1{:}10^{120}$

In commenting on the difficulty associated with getting the exact ratio of electrons to protons merely "by accident," one astronomer wrote:

> One part in 10^{37} is such an incredibly sensitive balance that it is hard to visualize. The following analogy might help: Cover the entire North American continent in dimes all the way up to the moon, a height of about 239,000 miles. (In comparison, the money to pay for the U.S. federal government debt would cover one square mile less than two feet deep with dimes.). Next, pile dimes from here to the moon on a billion other continents the same size as North America. Paint one dime red and mix it into the billion of piles of dimes. Blindfold a friend and ask him to pick out one dime. The odds that he will pick the red dime are one in 10^{37} (Ross, 1993, p. 115, parenthetical item in orig.).

And it gets progressively more complicated, as John G. Cramer observed:

> A similar problem is raised by the remarkable "flatness" of the universe, the nearly precise balance between expansion energy and gravitational pull, which are within about 15% of perfect balance. Consider the mass of the universe as a cannonball fired upward against gravity at the Big Bang, a cannonball that for the past 8 billion years has been rising ever more slowly against the pull. The extremely large initial kinetic energy has been nearly cancelled by the extremely large gravitational energy debt. The remaining expansion velocity is only a tiny fraction of the initial velocity. The very small remaining expansion kinetic energy and gravitational potential energy are **still** within 15% of one another. To accomplish this, the original energy values at one second after the Big Bang must have matched to one part in 10^{15}. **That two independent variables should match to such unimaginably high precision seems unlikely** (1999, first emp. in orig.; second emp. added).

At every turn, there are more examples of the fact that the Universe is "fine-tuned" to such an incredible degree that it becomes impossible to sustain the belief that it "just happened" as the result of (to quote Victor Stenger) "a random quantum fluctuation in a spaceless, timeless void." For example, cosmologists speak of a number known as the "Omega" value. In *Wrinkles of Time*, physicists Smoot and Davidson discussed Omega as follows.

> If the density of the mass in the universe is poised precisely at the boundary between the diverging paths to ultimate collapse and indefinite expansion, then the Hubble expansion may be slowed, perhaps coasting to a halt, but never reversed. This happy state of affairs is termed the **critical density**.

The critical density is calculated to be about five millionths of a trillionth of a trillionth (5×10^{-30}) of a gram of matter per cubic centimeter of space, or equivalent to about one hydrogen atom in every cubic meter–a few in a typical room. This sounds vanishingly small, and it is.... If we know the critical density, then we can–in theory–begin to figure out our fate. All we have to do is count up all mass in the universe and compare it to the critical density. **The ratio of the actual density of mass in the universe to the critical density is known, ominously, by the last letter in the Greek alphabet, Omega, Ω.** An Omega of less than 1 leads to an open universe (the big chill), and more than 1 to a closed universe (the big crunch). An Omega of exactly 1 produces a flat universe....

The important thing to remember is that the shape, mass, and fate of the cosmos are inextricably linked; they constitute a single subject, not three. These three aspects come together in, in Omega, the ratio of the actual density to the critical density. The task of measuring the actual density of the universe is extremely challenging, and most measurements produce only approximate figures.... What's the bottom line?... [W]e arrive at an average density of the universe of close to the critical density: Omega is close to 1.... If Omega were well below 1, however, then very few regions would collapse. If Omega were well above 1, then everything would collapse. The closer Omega is to 1, the easier it is to form the structure of the universe that astronomers now observe....

When we learn of the consequences of Omega being anything other than precisely 1, we see how very easily our universe might not have come into existence: The most minute deviation either side of an Omega of 1 consigns our potential universe to oblivion.... There is a long list of physical laws and conditions that, varied slightly,

> **would have resulted in a very different universe, or no universe at all. The Omega-equals-1 requirement is among them** (1993, pp. 158,160,161, 190, emp. added).

The problem, however, is not just that Omega must be so very exact. A "flat" Universe is one that continues to expand forever, but at a rate that is so strongly influenced by gravitational forces that the expansion gradually slows down over billions of years and eventually almost stops. For this to occur, however, the Universe would have to be exactly at critical density. Yet as Roy C. Martin Jr. pointed out in his book, *Astronomy on Trial*:

> A critical density, a very, very, very critical density, would be required to just balance the expansion with gravitation. The trouble is that the required balance of forces is so exact, that the chance of it happening would have to be something like one in a thousand trillions, and no measurements, or mathematics, or even theory supports a concept of such exactness. It would take an enormous amount of luck for a Flat universe to evolve, and it is just about mathematically impossible.
>
> As we said, scientists favor this model, even though there is no scientific justification whatsoever for their choosing this over any other. Why is this idea popular? Well, if you and I were given the choice of a universe scheduled for a slow death, one scheduled to collapse in a big crunch, or a universe scheduled to go on forever, which would we choose? We all, scientist and not, consider an ongoing Flat universe far more palatable. It's merely intuitive, of course, but scientists are human also. It should not be missed that the Flat, ongoing universe, the one that is almost mathematically impossible, is the closest to an infinitely lasting universe that **could not** have been born in a Big Bang, and the closest to what we observe! (1999, p. 160, emp. in orig.).

Additional problems center on the topics of the so-called "dark energy" that supposedly makes up most of the Universe. Earlier, I quoted *Time* writer Michael Lemonick who remarked: "...[A]strophysicists can be pretty sure they have assembled the full parts list for the cosmos at last:5% ordinary matter, 35% exotic dark matter and about 60% dark energy" (2001, 157[25]:55). That "dark energy" is an "an unknown form of energy often called the cosmological constant" (see Preuss, 2000).

Albert Einstein was the first to introduce the concept of the so-called cosmological constant–which he designated by the Greek letter Lambda (λ)–to represent this force of unknown origin. As Barrow noted, the force of the energy is said to be "fifty per cent more than that of all the ordinary matter in the Universe" (2000, p. 191). And, as he went on to observe, the value of lambda

> is bizarre: roughly 10^{-120}–that is, 1 divided by 10 followed by 119 zeros! This is the smallest number ever encountered in science. Why is it not zero? How can the minimum level be tuned so precisely? If it were 10 followed by just 117 zeros, then the galaxies could not form. Extraordinary fine-tuning is needed to explain such extreme numbers.... Why is its final state so close to the zero line? How does it "know" where to end up when the scalar field starts rolling downhill in its landscape? Nobody knows the answers to these questions. They are the greatest unsolved problems in gravitation physics and astronomy.... The only consolation is that, **if these observations are correct, there is now a very special value of lambda to try to explain** (pp. 259,260-261, emp. added).

And so, once more science has found itself face-to-face with yet another inexplicable, finely tuned force of nature that "somehow" must be explained by blind, random, naturalistic forces. One would think that, after confronting **so many**

of these finely tuned forces, scientists finally would admit the obvious. To use the words of evolutionist H.S. Lipson of Great Britain: "I think, however, that we must go further than this and admit that the only acceptable explanation is **creation**" (1980, 31:138, emp. in orig.).

Science is based on observation and reproducibility. But when pressed for the reproducible, empirical data that document their claim of a self-created Universe, scientists and philosophers are at a loss to produce those data. Perhaps this is why Alan Guth, co-developer of the original inflationary Universe theory, lamented: "In the end, I must admit that questions of plausibility are not logically determinable and depend somewhat on intuition" (1988, 11[2]:76)—which is little more than a fancy way of saying, "I certainly **wish** this were true, but I could not **prove** it to you if my life depended on it." To suggest that the Universe created itself is to posit a self-contradictory position. Sproul addressed this when he wrote:

> For something to bring itself into being it must have the power of being within itself. It must at least have enough causal power to cause its own being. If it derives its being from some other source, then it clearly would not be either self-existent or self-created. It would be, plainly and simply, an effect. Of course, the problem is complicated by the other necessity we've labored so painstakingly to establish: It would have to have the causal power of being before it was. It would have to have the power of being before it had any being with which to exercise that power (1994, p. 180).

The Universe is not eternal. Nor did not create itself from nothing.

The choice is between **matter only** or **more than matter** as the fundamental explanation for the existence and orderliness of the Universe. The difference, therefore, is the difference between: (a) **time, chance, and the inherent properties of matter;** or (b) **design, creation, and the irreduc-**

ible properties of organization. There are only two possible explanations for the origin of the order that characterizes the Universe and life in the Universe: either that order was **imposed on** matter, or it **resides within** matter. If it is suggested that the order resides within matter, we respond by saying that we certainly have not seen the evidence of such.

The Law of Cause and Effect, and the cosmological argument based upon that law, have serious implications in every field of human endeavor. The Universe is here, and must have an adequate antecedent cause. In addressing this problem, R.L. Wysong commented:

> Everyone concludes naturally and comfortably that highly ordered and designed items (machines, houses, etc.) owe existence to a designer. It is unnatural to conclude otherwise. But evolution asks us to break stride from what is natural to believe and then believe in that which is unnatural, unreasonable, and... unbelievable.... The basis for this departure from what is natural and reasonable to believe is not fact, observation, or experience but rather unreasonable extrapolations from abstract probabilities, mathematics, and philosophy (1976, p. 412, first ellipsis in orig.).

Dr. Wysong presented an interesting historical case to illustrate his point. Some years ago, scientists were called to Great Britain to study orderly patterns of concentric rocks and holes–a find designated as Stonehenge. As studies progressed, it became apparent that these patterns had been designed specifically to allow certain astronomical predictions. Many questions (e.g., how ancient peoples were able to construct an astronomical observatory, how the data derived from their studies were used, etc.) remain unsolved. But one thing is known–the **cause** of Stonehenge was intelligent design.

Now, Wysong suggested, compare Stonehenge to the situation paralleling the origin of the Universe, and of life itself. We study life, observe its functions, contemplate its complex-

ity (which defies duplication even by intelligent men with the most advanced methodology and technology), and what are we to conclude? Stonehenge **might** have been produced by the erosion of a mountain, or by catastrophic natural forces working in conjunction with meteorites to produce rock formations and concentric holes. But what scientist or philosopher ever would suggest such an idea?

No one could ever be convinced that Stonehenge "just happened" by accident, yet atheists and agnostics expect us to believe that this highly ordered, well-designed Universe, and the complicated life it contains, "just happened." To accept such an idea is, to use Dr. Wysong's words, "to break stride from what is natural to believe" because the conclusion is unreasonable, unwarranted, and unsupported by the facts at hand. The cause simply is not adequate to produce the effect.

The central message of the cosmological argument, and the Law of Cause and Effect upon which it is based, is this: Every material effect must have an adequate antecedent cause. The Universe is here; intelligent life is here; morality is here; love is here. What is their adequate antecedent cause? Since the effect can never precede, nor be greater than the cause, it stands to reason that the Cause of life must be a living Intelligence which Itself is both moral and loving. When the Bible records, "In the beginning, God...," it makes known to us just such a First Cause.

3

DESIGN IN NATURE– THE TELEOLOGICAL ARGUMENT

One of the laws of thought employed in the field of logic is the Law of Rationality, which states that one should accept as true only those conclusions for which there is adequate evidence. This is sensible, for accepting as true a conclusion for which there is no evidence, or inadequate evidence, would be irrational. In discussing the *prima facie* case for God's existence, theists present–through logic, clear reasoning, and factual data–arguments that are adequate to justify the acceptance of the conclusion that God exists. The approach is intended to be positive in nature, and to establish a proposition for which adequate evidence is available.

The evidence used to substantiate the theist's proposition concerning God's existence may take many forms. This should not be surprising since, if He does exist, God would be the greatest of all realities. His existence, therefore, could be extrapolated not from just a single line of reasoning, but from numerous avenues. As one writer of the past suggested:

> The reality of such a Being can be firmly established only by concurrent reasons coming from various realms of existence, and approved by various powers of the human spirit. It is a conclusion that cannot

> be reached without the aid of arguments inadequate by themselves to so great a result, yet valid in their place, proving each some part of the great truth; proofs cumulative and complementary, each requiring others for its completion (Clarke, 1912, p. 104).

The various arguments presented by theists, all combined, make an ironclad case for God's existence. Where one particular argument fails to impress or convince an inquirer, another will avail. Considered cumulatively, the evidence is adequate to justify the intended conclusion. It is my purpose here to present and discuss additional evidence substantiating the proposition: God exists.

In contending for the existence of God, theists often employ the teleological argument. "Teleology" has reference to purpose or design. Thus, this approach suggests that where there is purposeful design, there must be a designer. The deduction being made, of course, is that order, planning, and design in a system are indicative of intelligence, purpose, and specific intent on the part of the originating cause. In logical form, the theist's argument may be presented as follows:

1. If the Universe evinces purposeful design, there must have been a designer.
2. The Universe does evince purposeful design.
3. Thus, the Universe must have had a designer.

This correct form of logical reasoning, and the implications that flow from it, have not escaped the attention of those who do not believe in God. Paul Ricci, an atheistic philosopher and university professor, has written that "...it's true that everything designed has a designer..." (1986, p. 190). In fact, Mr. Ricci even conceded that the statement, " 'Everything designed has a designer,' is an analytically true statement," and thus requires no formal proof (p. 190). Apparently Mr. Ricci understands that one does not get a poem without a poet, a law without a lawgiver, a painting without a painter, or design without a designer.

He is in good company among his disbelieving counterparts. For example, atheistic evolutionist Richard Lewontin made the following admission in an article he authored for *Scientific American*:

> Life forms are more than simply multiple and diverse, however. Organisms fit remarkably well into the external world in which they live. They have morphologies, physiologies and behaviors that appear to have been carefully and artfully designed to enable each organism to appropriate the world around it for its own life. It was the marvelous fit of organisms to the environment, much more than the great diversity of forms, that was **the chief evidence of a Supreme Designer** (1978, 239[3]:213, emp. added).

To be fair to both of these authors, and others like them, let me quickly point out that while they agree with the thrust of the theist's argument (i.e., that design leads inevitably to a designer), they do not believe that there is evidence warranting the conclusion that a Supreme Designer exists, and they therefore reject any belief in God. Their disagreement with the theist, therefore, would center on statement number two (the minor premise) in the above syllogism. While admitting that design demands a designer, they would deny that there is design in nature providing proof of the existence of a Great Designer.

A good example of such a denial can be found in a book written by British evolutionist, Richard Dawkins. During the 1800s, William Paley employed his now-famous "watch argument." Paley argued that if one were to discover a watch lying upon the ground and were to examine it closely, the design inherent in the watch would be enough to force the conclusion that there must have been a watchmaker. Paley continued his line of argumentation to suggest that the design inherent in the Universe should be enough to force the conclusion that there must have been a Great Designer. In 1986,

Dawkins published *The Blind Watchmaker*, which was intended to put to rest once and for all Paley's argument. The dust jacket of Dawkins' book made that point clear.

> There may be good reasons for belief in God, but the argument from design is not one of them.... [D]espite all appearances to the contrary, there is no watchmaker in nature beyond the blind forces of physics.... Natural selection, the unconscious, automatic, blind yet essentially nonrandom process that Darwin discovered, and that we now understand to be the explanation for the existence and form of all life, has no purpose in mind. It has no mind and no mind's eye. It does not plan for the future. It has no vision, no foresight, no sight at all. If it can be said to play the role of watchmaker in nature, it is the **blind** watchmaker (emp. in orig.).

The disagreement between the theist and atheist is not whether design demands a designer. Rather, the point of contention is whether or not there **is** design in nature adequate to substantiate the conclusion that a Designer does, in fact, exist. This is where the teleological argument is of benefit.

DESIGN OF THE UNIVERSE

Our Universe operates in accordance with exact scientific laws. The precision of the Universe, and the exactness of these laws, allow scientists to launch rockets to the Moon, with the full knowledge that, upon their arrival, they can land within a few feet of their intended target. Such precision and exactness also allow astronomers to predict solar/lunar eclipses years in advance or to determine when Halley's Comet can be seen once again from the Earth. Science writer Lincoln Barnett once observed:

> This functional harmony of nature Berkeley, Descartes, and Spinoza attributed to God. Modern physicists who prefer to solve their problems without re-

> course to God (although this seems to be more difficult all the time) emphasize that nature mysteriously operates on mathematical principles. It is the mathematical orthodoxy of the Universe that enables theorists like Einstein to predict and discover natural laws, simply by the solution of equations (1959, p. 22, parenthetical comment in orig.).

The precision, complexity, and orderliness within the Universe are not in dispute; writers such as Ricci, Dawkins, and Lewontin acknowledge as much. But while atheists willingly concede complexity, and even order, they are not prepared to concede design because the implication of such a concession would demand a Designer. Is there evidence of **design**? The atheist claims that no such evidence exists. The theist, however, affirms that it does, and offers the following information in support of that affirmation.

We live in a tremendously large Universe. While its outer limits have not been measured, it is estimated to be as much as 20 billion light years in diameter. [A light-year is the distance that light travels in a vacuum in one year at a speed of slightly more than 186,000 miles per second. Distances expressed in light-years give the time that light would take to cross that distance.] There are an estimated one billion galaxies in the Universe (Lawton, 1981), and an estimated 25 **sextillion** stars. The Milky Way galaxy in which we live contains over 100 billion stars, and is so large that even traveling at the speed of light would require 100,000 years to cross its diameter. Light travels approximately 5.88×10^{12} miles in a single year; in 100,000 years, that would be 5.88×10^{17} miles, or 588 **quadrillion** miles just to cross the diameter of a single galaxy. Without doubt, this is a rather impressive Universe. As the psalmist stated: "The heavens declare the glory of God, and the firmament [sky] shows His handiwork" (Psalm 19:1). Indeed they do! The writer of the book of Hebrews stated: "Every house is builded by some one; but he that built all

things is God" (3:4). Just one verse prior to that, he wrote: "He that built the house hath more honor than the house" (3:3). God's activities of day four of the Creation week show that He certainly is due "more honor than" the Universe He created!

Yet while the size itself is impressive, the inherent design is even more so. The Sun is like a giant nuclear engine. It gives off more energy in a single second than mankind has produced since the Creation. It converts 8 million tons of matter into energy **every single second**, and has an interior temperature of more than 20 million degrees Celsius (see Lawton, 1981). The Sun also produces radiation, which, in certain amounts, can be deadly to living things. The Earth, however, is located at exactly the correct distance from the Sun to receive the proper amount of heat and radiation to sustain life as we know it. We should be grateful that we live so far from the Sun, because the 93 million miles of empty space between the Earth and the Sun help stop the destructive pressure waves given off by the Sun as it converts matter to energy. If the Earth were much closer to the Sun, human life could not survive because of the horrible heat and pressure. If the Earth were moved just 10% closer to the Sun (about 10 million miles), far too much radiation (and heat) would be absorbed. If the Earth were moved just 10% farther from the Sun, too little heat would be absorbed. Either scenario would spell doom for life on the Earth. Fortunately, humans receive a certain amount of protection from the Sun's radiation because in one of the layers of the atmosphere (known as the mesosphere–about 12 to 18 miles above the Earth), there is a special form of oxygen known as ozone, which filters out most of the ultraviolet rays from the Sun that would be harmful (or fatal) in larger amounts. In addition, the Sun constantly sends out an invisible wind that is composed of protons and electrons. These particles approach the Earth from outer space at an extremely high speed, and could be very dangerous to humans. Fortunately, most of these protons and electrons are reflected back into space

because God created the Earth like a giant magnet that pushes away the solar wind and makes life on Earth both possible and comfortable.

The Earth is rotating on its axis at 1,000 miles per hour at the equator, and moving around the Sun at 70,000 miles per hour (approximately 19 miles per second), while the Sun and its solar system are moving through space at 600,000 miles per hour in an orbit so large it would take over 226 million years just to complete a single orbit. This rotation provides periods of light and darkness–a phenomenon necessary for sustaining life as we know it. If the Earth rotated much faster, fierce cyclones would stir over the Earth like a kitchen food-mixer. If the Earth turned significantly slower, the days and nights would be impossibly hot or cold. Venus, for example, turns only once every 243 days, which accounts in part for the fact that daytime temperatures can reach as high as 500 degrees Celsius (remember: water boils at 100 degrees Celsius). The Earth's orbital speed and tilt are "just right." Just by accident? The Earth completes its orbit once every 365.25 days–the time period we designate as a year. This, together with the fact that the Earth is tilted on its axis, allows for what we refer to as seasons.

The Earth's orbit is not a perfect circle, however, but is elliptical. This means that sometimes the Earth is closer to the Sun than at other times. In January, the Earth is closest to the Sun; in July, it is farthest away. When it is closer, the Earth "speeds up" to avoid being pulled into the Sun; when it is farther away, it "slows down," so that it remains in a position in space that is "just right." How does the Earth "know" to do all of this?

Interestingly, as the Earth moves in its orbit around the Sun, it departs from a straight line by only one-ninth of an inch every eighteen miles. If it departed by one-eighth of an inch, we would come so close to the Sun that we would be incinerated; if it departed by one-tenth of an inch, we would

find ourselves so far from the Sun that we would all freeze to death (see *Science Digest*, 1981). What would happen if the rotation rate of the Earth were cut in half, or doubled? If it were halved, the seasons would be doubled in their length, which would cause such harsh heat and cold over much of the Earth that it would be difficult, if not impossible, to grow enough food to feed the Earth's population. If the rotation rate were doubled, the length of each season would be halved, and again it would be difficult or impossible to grow enough food to feed the Earth's population.

The Earth is tilted on its axis at exactly 23.5 degrees. If it were not tilted, but sat straight up in its orbit around the Sun, there would be no seasons. The tropics would be hotter, and the deserts would get bigger. If the tilt went all the way over to 90 degrees, much of the Earth would switch between very cold winters and very hot summers.

The Earth is poised some 240,000 miles from the Moon. This, too, is just right. The Moon helps control the movement of the oceans (tides). This movement is very beneficial to the Earth, because it provides a cleansing of shorelines, and helps ocean life to prosper. Tides are an important part of ocean currents. Without these currents, the oceans would stagnate, and the animals and plants living in the oceans and seas soon would perish. Our existence as humans depends upon the Moon's tides, which help to balance a delicate food chain in nature. If the Moon were moved closer to the Earth by just a fifth, the tides would be so enormous that twice a day they would reach 35-50 feet high over most of the Earth's surface.

The Earth's oceans are another good example of perfect design. Water covers about 72% of the Earth's surface, which is good because the oceans provide a reservoir of moisture that constantly is evaporating and condensing. Eventually, this causes rain to fall on the Earth. It is a well-known fact that water heats and cools at a much slower rate than a solid land

mass, which explains why desert regions can be blistering hot in the daytime and freezing cold at night. Water, however, holds its temperature longer, and provides a sort of natural heating/air-conditioning system for the land areas of the Earth. The Earth's annual average temperature (56°F; 13.3°C) is closely maintained by the great reservoir of heat found within the waters of the oceans. Temperature extremes would be much more erratic than they are, were it not for the fact that approximately four-fifths of the Earth is covered with water. In addition, humans and animals inhale oxygen and exhale carbon dioxide. On the other hand, plants take in carbon dioxide and give off oxygen. We depend upon the world of botany for our oxygen supply, yet we often fail to realize that approximately 90% of our oxygen derives from microscopic plants in the seas (see Asimov, 1975, 2:116). If our oceans were appreciably smaller, quite soon we would run out of air to breathe.

Wrapped around the Earth is a protective blanket we know as the atmosphere. It is composed of nitrogen (78%), oxygen (21%), and carbon dioxide (0.03%), in addition to water vapor and small levels of other gases. The proper balance of these gases is essential to life on the Earth. The atmosphere of Venus is too thick to sustain life; that of Mars is too thin. But the Earth's atmosphere does several things. It scatters light waves to that you can read the words on this page. It captures solar heat so that it does not escape too rapidly. Without atmosphere, the heat would escape as soon as the Sun set each day, and nights would be unbearably cold. Frequently, meteors fall from space. Were it not for the fact that most of them burn up (from friction) when they strike the atmosphere, the Earth would be pounded almost daily by these unwelcome visitors. And, electronically charged particles called "ions" in the upper atmosphere (known as the ionosphere) help make radio communications on the Earth possible. The Earth has an atmosphere that is "just right." Just by accident?

Can a rational person reasonably be expected to believe that these exacting requirements for life as we know it have been met "just by accident"? The Earth is exactly the right distance from the Sun; it is exactly the right distance from the Moon; it has exactly the right diameter; it has exactly the right atmospheric pressure; it has exactly the right tilt; it has exactly the right amount of oceanic water; it has exactly the right weight and mass; and so on. Were this many requirements to be met in any other essential area of life, the idea that they had been provided "just by accident" would be dismissed immediately as ludicrous. Yet atheists, agnostics, skeptics, and infidels suggest that the Universe, the Earth, and life on the Earth are all here as a result of fortuitous accidents. Physicist John Gribbin (1983), writing on the numerous specific requirements necessary for life on our planet, emphasized in great detail both the nature and essentiality of those requirements, yet curiously chose to title his article, "Earth's Lucky Break"—as if all of the precision, orderliness, and intricate design in the Universe could be explained by postulating that the Earth simply received, in a roll of the cosmic dice, a "lucky break."

Yet atheist Richard Dawkins of Oxford University has admitted: "The more statistically improbable a thing is, the less we can believe that it just happened by blind chance. Superficially, **the obvious alternative to chance is an intelligent Designer**" (1982, 94:130, emp. added). Except for the fact that they do not believe it to be "superficial," that is the very conclusion theists have drawn from the available evidence. The statistical improbability of the Universe "just happening by blind chance" is staggering. Nobel laureate Arno Penzias put it this way: "Astronomy leads us to a unique event, a universe which was created out of nothing, one with the very delicate balance needed to provide exactly the conditions required to permit life, and one which has an underlying (one might say 'supernatural') plan" (as quoted in Margenau and

Varghese, 1992, p. 83, parenthetical item in orig.). Who designed the Universe with "the very delicate balance needed to provide exactly the conditions required to permit life"? The answer, of course, is the intelligent Designer of the Bible–God.

DESIGN OF THE HUMAN BODY

Many years ago, the ancient scholar Augustine observed that "Men go abroad to wonder at the height of mountains, at the huge waves of the sea, at the long course of the rivers, at the vast compass of the ocean, at the circular motion of the stars; and they pass by themselves without wondering." Indeed, while we stand in amazement at so many stunning scenes from our unique Universe, we frequently fail to stand equally amazed at the marvelous creation of man. According to those who do not believe in God, the human body is little more than the result of a set of fortuitous circumstances credited to that mythical lady, "Mother Nature." Yet such a suggestion does not fit the actual facts of the case, as even evolutionists have been forced to recognize from time to time. The late George Gaylord Simpson of Harvard once suggested that in man one finds "the most highly endowed organization of matter that has yet appeared on the earth..." (1949, p. 293). Another evolutionist observed:

> When you come right down to it, the most incredible creation in the universe is you–with your fantastic senses and strengths, your ingenious defense systems, and mental capabilities so great you can never use them to the fullest. Your body is a structural masterpiece more amazing than science fiction (Guinness, 1987, p. 5).

Can one reasonably be expected to conclude that the "structural masterpiece" of the human body–with its "ingenious" systems and "highly endowed organization"–is the result of

blind chance operating over eons of time in nature as atheism suggests? Or would it be more in keeping with the facts of the matter to suggest that the human body is the result of purposeful design by a Master Designer?

One scientist wrote: "Where do I start? The human body is so amazing and so detailed that one of the hardest aspects of teaching about it is deciding where to begin" (Wile, 2000, p. 267). For organizational purposes, the human body may be considered at four different levels (see Jackson, 1993, pp. 5-6). First, there are cells, representing the smallest unit of life. Second, there are tissues (muscle tissue, nerve tissue, etc.), which are groups of the same kind of cells carrying on the same kind of activity. Third, there are organs (heart, liver, etc.), which are groups of tissues working together in unison. Fourth, there are systems (reproductive system, circulatory system, etc.), which are composed of groups of organs carrying out specific bodily functions. An investigation of these various levels of organization, and of the human body as a whole, leads inescapably to the conclusion that there is intelligent design at work. As Wayne Jackson noted: "It is therefore quite clear...that the physical body has been marvelously designed and intricately organized, for the purpose of facilitating human existence upon the planet Earth" (1993, p. 6). In light of the following facts, such a statement certainly is justified.

The Body's Cells

A human body is composed of over 250 different kinds of cells (red blood cells, white blood cells, muscle cells, fat cells, nerve cells, etc.–Baldi, 2001, p. 147), totaling approximately 100 trillion cells in an average adult (Fukuyama, 2002, p. 58). These cells come in a variety of sizes and shapes, with different functions and life expectancies. For example, some cells (e.g., male spermatozoa) are so small that 20,000 would fit inside a capital "O" from a standard typewriter, each being only

0.05 mm long. Some cells, placed end-to-end, would make only one inch if 6,000 were assembled together. Yet all the cells of the human body, if set end-to-end, would encircle the Earth over 200 times. Even the largest cell of the human body, the female ovum, is unbelievably small, being only 0.01 of an inch in diameter.

Anatomist Ernst Haeckel, Charles Darwin's chief supporter in Germany in the mid-nineteenth century, once summarized his personal feelings about the "simple" nature of the cell when he wrote that it contained merely "homogeneous globules of plasm" that were

> composed chiefly of carbon with an admixture of hydrogen, nitrogen, and sulfur. These component parts properly united produce the soul and body of the animated world, and suitably nursed became man. With this single argument the mystery of the universe is explained, the Deity annulled, and a new era of infinite knowledge ushered in (1905, p. 111).

Voilà! As easy as that, simple "homogeneous globules of plasm" nursed man into existence, animated his body, dispelled the necessity of a Creator, and ushered in a new era of "infinite knowledge." In the end, however, Haeckel's simplistic, naturalistic concept turned out to be little more than wishful thinking. As Lester and Hefley put it:

> We once thought that the cell, the basic unit of life, was a simple bag of protoplasm. Then we learned that each cell in any life form is a teeming micro-universe of compartments, structures, and chemical agents—and each human being has billions of cells... (1998, pp. 30-31).

Billions of cells indeed! In the section he authored on the topic of "life" for the *Encyclopaedia Britannica*, the late astronomer Carl Sagan observed that a single human being is composed of what he referred to as an "ambulatory collection of 10^{14} cells" (1997, 22:965). He then noted: "The information con-

tent of a simple cell has been established as around 10^{12} bits, comparable to about a hundred million pages of the *Encyclopaedia Britannica*" (22:966). Evolutionist Richard Dawkins acknowledged that the cell's nucleus "contains a digitally coded database larger, in information content, than all 30 volumes of the *Encyclopaedia Britannica* put together. And this figure is for **each** cell, not all the cells of a body put together" (1986, pp. 17-18, emp. in orig.). Dr. Sagan estimated that if a person were to count every letter in every word in every book of the world's largest library (approximately 10 million volumes), the total number of letters would be 10^{12}, which suggests that the "simple cell" contains the information equivalent of the world's largest library (1974, 10:894)! Rational people recognize that not one of the books in such a library "just happened." Rather, each and every one is the result of intelligence and painstaking **design**. Stephen C. Meyer suggested:

> Since the late 1950s, advances in molecular biology and biochemistry have revolutionized our understanding of the miniature world within the cell. Modern molecular biology has revealed that living cells—the fundamental units of life—possess the ability to store, edit and transmit information and to use information to regulate their most fundamental metabolic processes. Far from characterizing cells as simple "homogeneous globules of plasm," as did Ernst Haeckel and other nineteenth-century biologists, modern biologists now describe cells as, among other things, "distributive real-time computers" and complex information processing systems (1998, pp. 113-114).

So much for the "simple" cell being a lump of albuminous combination of carbon, as Haeckel once put it.

Cells have three major components. First, each cell is composed of a cell membrane that encloses the organism. The lipoprotein cell membrane (lipids/proteins/lipids–known as a bilipid membrane) is approximately 0.06-0.08 of a microm-

eter thick, yet allows selective transport into, and out of, the cell. Evolutionist Ernest Borek has observed: "The membrane recognizes with its uncanny molecular memory the hundreds of compounds swimming around it and permits or denies passage according to the cell's requirements" (1973, p. 5).

Second, inside the cell is a three-dimensional cytoplasm–a watery matrix containing specialized organelles. Inside the cytoplasm, there are over 20 different chemical reactions occurring at any one time, with each cell containing five major components for: (1) communication; (2) waste disposal; (3) nutrition; (4) repair; and (5) reproduction. Within this watery matrix there are such organelles as the mitochondria (over 1,000 per cell, in many instances) that provide the cell with its energy. The endoplasmic reticulum is a "...transport system designed to carry materials from one part of the cell to the other" (Pfeiffer, 1964, p. 13). Ribosomes are miniature protein-producing factories. Golgi bodies store the proteins manufactured by the ribosomes. Lysozomes within the cytoplasm function as garbage disposal units. Vacuoles aid in intracellular cleaning processes. And so on.

Third, within the cytoplasm is the nucleus, which contains most of the genetic material, and which serves as the control center of the cell. The nucleus is the control center of the cell, and is separated from the cytoplasm by a nuclear membrane. Within the nucleus is the genetic machinery of the cell (chromosomes and genes containing deoxyribonucleic acid–DNA). The DNA is a supermolecule that carries the coded information for the replication of the cell. If the DNA from a single human cell were removed from the nucleus and unraveled (it is found in the cell in a spiral configuration), it would be approximately six feet long, and would contain approximately 3.1 billion base pairs (Watson, 2003, p. 204). It has been estimated that if all the DNA in an adult human were placed end-to-end, it would reach to the Sun and back (186 million miles) 400 times.

It also should be noted that the DNA molecule does something that we as humans have yet to accomplish: it stores coded information in a chemical format, and then uses a biologic agent (RNA) to decode and activate it. As Darrel Kautz has stated: "Human technology has not yet advanced to the point of storing information **chemically** as it is in the DNA molecule" (1988, p. 45, emp. in orig.; see also Jackson, 1993, pp. 11-12). If transcribed into English, the DNA in the human genome (i.e., in a spermatozoon or ovum) would fill a 300-volume set of encyclopedias of approximately 2,000 pages each (Baldi, 2001, p. 21). Yet just as amazing is the fact that all the genetic information needed to reproduce the entire human population (about six billion people) could be placed into a space of about one-eighth of a cubic inch. In comparing the amount of information contained in the DNA molecule with a much larger computer microchip, evolutionist Irvin Block remarked: "We marvel at the feats of memory and transcription accomplished by computer microchips, but these are gargantuan compared to the protein granules of deoxyribonucleic acid, DNA" (1980, p. 52).

The Reproductive Methods of Cells

Cells are absolute marvels of design when it comes to reproducing themselves. Cellular reproduction consists of at least two important functions–duplication of the cell's complement of genetic material and cleavage of the cell's cytoplasmic matrix into two distinct yet separate parts. However, not all cells reproduce in the same manner.

Speaking in general terms, there are two basic types of cells found in organisms that procreate sexually. First, there are somatic (body) cells that contain a full complement (the diploid number) of genes. Second, there are germ (egg and sperm) cells that contain half the complement (the haploid number) of genes. Likely, the reason that germ cells (gametes) contain only half the normal genetic content is fairly obvious. Since

the genetic material in the two gametes is combined during procreation in order to form a zygote (which will develop first into an embryo, then into a fetus, and eventually into the neonate), in order to ensure that the zygote has the normal, standard chromosome number the gametes always must contain exactly half that necessary number. As Weisz and Keogh explained in their widely used textbook, *Elements of Biology*:

> One consequence of every sexual process is that a zygote formed from two gametes possesses twice the number of chromosomes present in a single gamete. An adult organism developing from such a zygote would consist of cells having a doubled chromosome number. If the next generation is again produced sexually, the chromosome number would quadruple, and this process of progressive doubling would continue indefinitely through successive generations. Such events do not happen, and chromosome numbers do stay constant from one life cycle to the next (1977, p. 331).

Why is it, though, that chromosome numbers "do stay constant from one life cycle to the next?" The answer, of course, has to do with the two different types of cellular division. All somatic cells reproduce by the process known as **mitosis**. Most cells in sexually reproducing organisms possess a nucleus that contains a preset number of chromosomes. In mitosis, cell division is "a mathematically precise doubling of the chromosomes and their genes. The two chromosome sets so produced then become separated and become part of two newly formed nuclei" so that "the net result of cell division is the formation of two cells that match each other and the parent cell precisely in their gene contents and that contain approximately equal amounts and types of all other components" (Weisz and Keogh, pp. 322,325). Thus, mitosis carefully maintains a constant diploid chromosome number during cellular division. For example, in human somatic cells, there

are 46 chromosomes. During mitosis, from the original "parent" cell two new "daughter" cells are produced, each of which then contains 46 chromosomes.

Germ cells, on the other hand, reproduce by a process known as **meiosis**. During this type of cellular division, the diploid chromosome number is halved ("meiosis" derives from the Greek meaning to split or divide). So, to use the example of the human, the diploid chromosome complement of 46 is reduced to 23 in each one of the newly formed cells. As Weisz and Keogh observed:

> Meiosis occurs in every life cycle that includes a sexual process–in other words, more or less universally.... It is the function of meiosis to counteract the chromosome-doubling effect of fertilization by reducing a doubled chromosome number to half. The unreduced doubled chromosome number, before meiosis, is called the **diploid** number; the reduced number, after meiosis, is the **haploid** number (p. 331, emp. in orig.).

In his book, *The Panda's Thumb*, evolutionist Stephen Jay Gould discussed the marvel of meiosis.

> Meiosis, the splitting of chromosome pairs in the formation of sex cells, represents one of the great triumphs of good engineering in biology. Sexual reproduction cannot work unless eggs and sperm each contain precisely half the genetic information of normal body cells. The union of two halves by fertilization restores the full amount of genetic information.... This halving, or "reduction division," occurs during meiosis when the chromosomes line up in pairs and pull apart, one member of each pair moving to each of the sex cells. Our admiration for the precision of meiosis can only increase when we learn that cells of some ferns contain more than 600 pairs of chromosomes and that, in most cases, meiosis splits each pair without error (1980, p. 160).

And it is not just meiosis that works in most instances without error. Evolutionist John Gribbin admitted, for example, that "...once a fertilized, single human cell begins to develop, the original plans are **faithfully copied** each time the cell divides (a process called mitosis) so that every one of the thousand million million cells in my body, and in yours, contains a perfect replica of the original plans for the whole body" (1981, p. 193, parenthetical comment in orig., emp. added).

Regarding the "perfect replica" produced in cellular division, the late United Nations scientist A.E. Wilder-Smith observed:

> The Nobel laureate, F.H. Crick has said that if one were to translate the coded information on one human cell into book form, one would require one thousand volumes each of five hundred pages to do so. And yet the mechanism of a cell can copy faithfully at cell division all this information of one thousand volumes each of five hundred pages in just twenty minutes (1976, p. 258).

Information scientist Werner Gitt remarked:

> The DNA is structured in such a way that it can be replicated every time a cell divides in two. Each of the two daughter cells has to have identically the same genetic information after the division and copying process. This replication is so precise that it can be compared to 280 clerks copying the entire Bible sequentially each one from the previous one, with at most a single letter being transposed erroneously in the entire copying process.... One cell division lasts from 20 to 80 minutes, and during this time the entire molecular library, equivalent to one thousand books, is copied correctly (1997, p. 90).

But as great an engineering triumph as cellular division and reproduction are, they represent only a small part of the story regarding the marvelous design built into each living

cell. As Wilder-Smith also noted, the continued construction and metabolism of a cell are "dependent upon its internal 'handwriting' in the genetic code. Everything, even life itself, is regulated from a biological viewpoint by the information contained in this genetic code. All syntheses are directed by this information" (1976, p. 254).

Since all living things are storehouses of genetic information (i.e., within the genetic code), and since it is this cellular code that regulates life and directs its synthesis, the importance of the study of this code hardly can be overstated.

The Genetic Code–Its Design and Function

Faithful, accurate cellular division is critically important, of course, because without it life could not continue. But neither could life sustain itself without the existence and continuation of the extremely intricate genetic code contained within each cell. Scientific studies have shown that the hereditary information contained in the code found within the nucleus of the living cell is universal in nature. Regardless of their respective views on origins, all scientists acknowledge this. Evolutionist Richard Dawkins observed: "The genetic code is universal.... The complete word-for-word universality of the genetic dictionary is, for the taxonomist, too much of a good thing" (1986, p. 270). Creationist Darrel Kautz agreed: "It is recognized by molecular biologists that the genetic code is universal, irrespective of how different living things are in their external appearances" (1988, p. 44). Or, as Matt Ridley put it in his 1999 book, *Genome:*

> Wherever you go in the world, whatever animal, plant, bug or blob you look at, if it is alive, it will use the same dictionary and know the same code. **All life is one**. The genetic code, bar a few tiny local aberrations, mostly for unexplained reasons in the ciliate protozoa, is the same in every creature. We all use exactly the same language.

> **This means–and religious people might find this a useful argument–that there was only one creation, one single event when life was born**.... The unity of life is an empirical fact (pp. 21-22, emp. added).

It is the genetic code which ensures that living things reproduce faithfully "after their kind," exactly as the principles of genetics state that they should. Such faithful reproduction, of course, is due both to the immense complexity and the intricate design of that code. It is doubtful that anyone cognizant of the facts would speak of the "simple" genetic code. A.G. Cairns-Smith has explained why:

> Every organism has in it a store of what is called **genetic information**.... I will refer to an organism's genetic information store as its **Library**.... Where is the Library in such a multicellular organism? The answer is everywhere. With a few exceptions, every cell in a multicellular organism has a complete set of all the books in the Library. As such an organism grows, its cells multiply and in the process the complete central Library gets copied again and again.... The human Library has 46 of these cord-like books in it. They are called chromosomes. They are not all of the same size, but an average one has the equivalent of about 20,000 pages.... Man's Library, for example, consists of a set of construction and service manuals that run to the equivalent of about a million book-pages together (1985, pp. 9,10, emp. in orig.).

Wilder-Smith concurred with such an assessment when he wrote:

> Now, when we are confronted with the genetic code, we are astounded at once at its simplicity, complexity, and the mass of information contained in it. One cannot avoid being awed at the sheer density of information contained in such a miniaturized space. When one considers that the entire chemical information required to construct a man, elephant, frog,

> or an orchid was compressed into two minuscule reproductive cells, one can only be astounded. **Only a sub-human could not be astounded**. The almost inconceivably complex information needed to synthesize a man, plant, or a crocodile from air, sunlight, organic substances, carbon dioxide and minerals is contained in these two tiny cells. If one were to request an engineer to accomplish this feat of information miniaturization, one would be considered fit for the psychiatric line (1976, pp. 257-259, emp. in orig.).

It is no less amazing to learn that even what some would call "simple" cells (e.g., bacteria) have extremely large and complex "libraries" of genetic information stored within them. For example, the bacterium *Escherichia coli*, which is by no means the "simplest" cell known, is a tiny rod only a thousandth of a millimeter across and about twice as long, yet "it is an indication of the sheer complexity of *E. coli* that its Library runs to a thousand page-equivalent" (Cairns-Smith, p. 11). Biochemist Michael Behe has suggested that the amount of DNAin a cell "varies roughly with the complexity of the organism" (1998, p. 185). There are notable exceptions, however. Humans, for example, have about 100 times more of the genetic-code-bearing molecule (DNA) than bacteria, yet salamanders, which are amphibians, have 20 times more DNA than humans (see Hitching, 1982, p. 75). Humans have roughly 30 times more DNA than some insects, yet less than half that of certain other insects (see Spetner, 1997, p. 28).

It does not take much convincing, beyond facts such as these, to see that the genetic code is characterized by orderliness, complexity, and adeptness in function. The order and complexity themselves are nothing short of phenomenal. But the **function** of this code is perhaps its most impressive feature, as Wilder-Smith explained when he suggested that the coded information

> ...may be compared to a book or to a video or audiotape, with an extra factor coded into it enabling the genetic information, under certain environmental conditions, to read itself and then to execute the information it reads. It resembles, that is, a hypothetical architect's plan of a house, which plan not only contains the information on how to build the house, but which can, when thrown into the garden, build entirely of its own initiative the house all on its own without the need for contractors or any other outside building agents.... Thus, it is fair to say that the **technology** exhibited by the genetic code is orders of magnitude higher than any technology man has, until now, developed. What is its secret? The secret lies in its ability to store and to execute incredible magnitudes of conceptual information in the ultimate molecular miniaturization of the information storage and retrieval system of the nucleotides and their sequences (1987, p. 73, emp. in orig.).

This "ability to store and to execute incredible magnitudes of conceptual information" is where DNA comes into play. In their book, *The Mystery of Life's Origin*, Thaxton, Bradley, and Olsen discussed the DNA-based genetic code elucidated by Crick and Watson.

> According to their now-famous model, hereditary information is transmitted from one generation to the next by means of a simple code resident in the specific sequence of certain constituents of the DNA molecule.... The breakthrough by Crick and Watson was their discovery of the specific key to life's diversity. It was the extraordinarily complex yet orderly architecture of the DNA molecule. They had discovered that there is in fact a code inscribed in this "coil of life," bringing a major advance in our understanding of life's remarkable structure (1984, p. 1).

How important is the "coil of life" represented in the DNA molecule? Wilder-Smith concluded: "The information stored on the DNA-molecule is that which controls totally, as far as we at present know, by its interaction with its environment, the development of all biological organisms" (1987, p. 73). Professor E.H. Andrews summarized how this can be true:

> The way the DNA code works is this. The DNA molecule is like a template or pattern for the making of other molecules called "proteins." ...These proteins then control the growth and activity of the cell which, in turn, controls the growth and activity of the whole organism (1978, p. 28).

Thus, the DNA contains the information that allows proteins to be manufactured, and the proteins control cell growth and function, which ultimately are responsible for each organism. The genetic code, as found within the DNA molecule, is vital to life as we know it. In his book, *Let Us Make Man*, Bruce Anderson referred to it as "the chief executive of the cell in which it resides, giving chemical commands to control everything that keeps the cell alive and functioning" (1980, p. 50). Kautz followed this same line of thinking when he stated:

> The information in DNA is sufficient for directing and controlling all the processes which transpire within a cell including diagnosing, repairing, and replicating the cell. Think of an architectural blueprint having the capacity of actually building the structure depicted on the blueprint, of maintaining that structure in good repair, and even replicating it (1988, p. 44).

Likely, many people have not considered the exact terminology with which the genetic code is described in the scientific literature. Lester and Bohlin observed:

> The DNA in living cells contains coded information. It is not surprising that so many of the terms used in describing DNA and its functions are language terms.

> We speak of the genetic **code**. DNA is **transcribed** into RNA. RNA is **translated** into protein.... Such designations are not simply convenient or just anthropomorphisms. They accurately describe the situation (1984, pp. 85-86, emp. in orig.).

Kautz thus concluded:

> The information in the DNA molecule had to have been imposed upon it by some outside source just as music is imposed on a cassette tape. The information in DNA is presented in **coded** form as explained previously, and codes are not known to arise spontaneously.... Further, consider that human beings have learned to store information on clay tablets, stone, papyrus, paper, film, magnetic media such as audio and video cassettes, microchips, etc. Yet human technology has not yet advanced to the point of storing information **chemically** as it is in the DNA molecule (1988, pp. 44,45, emp. in orig.).

How, then, did this complex chemical code arise? What "outside source" imposed the information on the DNA molecule?

Origin of the Genetic Code

The nucleic acid-based genetic code exists. But whence has it come? Since the elucidation of the genetic code in the mid-1950s, materialists have suggested that those mythical parents, "Father Time" and "Mother Nature," gave birth to the genetic code via purely chance processes. As Nobel laureate Jacques Monod put it: "Chance alone is the source of every innovation, of all creation in the biosphere.... All forms of life are the product of chance..." (1972, pp. 110,167). Such a view, however, ascribes to "chance" properties that it does not, and cannot, possess. Sproul, Gerstner, and Lindsley addressed this logical fallacy and concluded:

> Chance is incapable of creating a single molecule, let alone an entire universe. Why not? Chance is no thing. It is not an entity. It has no being, no power, no force. It can effect nothing for it has no causal power within it (1984, p. 118).

Chance cannot create. And it certainly cannot create something as complex as the genetic code. Furthermore, as science writer Matt Ridley observed: "DNA is information, a message written in a code of chemicals" (1999, p. 13). And, as information scientist Werner Gitt correctly noted: "Coding systems are not created arbitrarily, but they are optimized according to criteria.... Devising a code is a **creative mental process**. Matter can be a **carrier** of codes, but it cannot **generate** codes" (1997, pp. 59,67, emp. added). Whence, then, has come the genetic code? What "creative mental process" imposed the information on it that it contains? In their textbook, *The New Biology,* evolutionists Robert Augros and George Stanciu wrote:

> What cause is responsible for the origin of the genetic code and directs it to produce animal and plant species? It cannot be matter because of itself matter has no inclination to these forms.... **There must be a cause apart from matter** that is able to shape and direct matter. Is there anything in our experience like this? Yes, there is: our own minds. The statue's form originates in the mind of the artist, who then subsequently shapes matter, in the appropriate way.... **For the same reasons there must be a mind that directs and shapes matter in organic forms** (1987, p. 191, emp. added).

In speaking of the origin of the genetic code, and the simultaneous appearance of the decoding mechanism that accompanies it, evolutionist Caryl Haskins lamented: "By a pre-Darwinian (or a skeptic of evolution after Darwin) **this puzzle would surely have been interpreted as the most pow-**

erful sort of evidence for special creation" (1971, 59:305, emp. added, parenthetical comment in orig.). Carl Sagan admitted:

> The number of possible ways of putting nucleotides together in a chromosome is enormous. Thus **a human being is an extraordinarily improbable object**. Most of the $10^{2.4 \times 10^9}$ possible sequences of nucleotides would lead to complete biological malfunction (1997, 22:967, emp. added).

Sir Francis Crick therefore wrote:

> An honest man, armed with all the knowledge available to us now, could only state that in some sense, **the origin of life appears at the moment to be almost a miracle**, so many are the conditions which would have had to have been satisfied to get it going (1981, p. 88, emp. added).

Wilder-Smith offered the following observation about the origin of the genetic code.

> The almost unimaginable complexity of the information on the genetic code along with the simplicity of its concept (four letters made of simple chemical molecules), together with its extreme compactness, **imply an inconceivably high intelligence behind it**. Present-day information theory permits no other interpretation of the facts of the genetic code (1976, pp. 258-259, parenthetical item in orig., emp. added).

This is the very point that Gitt made in his 1997 book on information theory when he wrote: "The coding system used for living beings is optimal from an engineering standpoint. This fact strengthens the argument that it was a case of **purposeful design** rather than fortuitous chance" (p. 95, emp. added). Earlier, I quoted Richard Dawkins, who observed: "The more statistically improbable a thing is, the less we can believe that it just happened by blind chance. Superficially the obvious alternative to chance is an intelligent Designer"

(1982, p. 130). I suggest, however, that since the genetic code "appears to be almost a miracle" which "implies an inconceivably high intelligence behind it," then it hardly is "superficial" to believe that it must have had a designer–the Creator-God of the Universe.

DNA, Genes, and Chromosomes

In most organisms, the primary genetic material is DNA. [Some viruses, primarily retroviruses, contain only RNA (see Nicholl, 1994, pp. 9-10; Ridley, 1999, p. 9).] What is DNA, and how does it work? In his book, *The Case Against Accident and Self-Organization,* Dean Overman provided the following excellent summary [see Figures 1 and 2 on the following pages].

> A DNA molecule is comprised of thousands of long chains of nucleotides (polynucleotides) each consisting of three parts. One part is the pentose or five carbon sugar known as deoxyribose. A second part is a phosphate group, and the third part is a nitrogen base of either adenine (A), guanine (G), cytosine (C) or thymine (T). Alternating sugar and phosphate molecules connect each nucleotide chain in a ladder type configuration coiled around a central axis in a twisted double spiral or helix. The two chains run in opposite directions with 10 nucleotides per turn of the helix. The rungs of the bases are pairs of either adenine and thymine (A-T) or cytosine with guanine (C-G). A relatively weak hydrogen bond connects these bases... (1997, p. 34).

Genes, then, are specific segments of DNA (although not all DNA assumes the form of genes; some resides in extranuclear organelles such as plasmids, and some is non-coding). Chromosomes–which consist of DNA and other material–are macromolecules composed of repeating nucleotides that serve as carriers for genes, with thousands of genes being aligned along each chromosome. [Not all human genes, how-

ever, are found on chromosomes; a few reside within mitochondria located in the cytoplasm; see Ridley, 1999, p. 9.] Each chromosome consists of a pair of long (roughly three feet), tightly coiled, double-stranded DNA molecules, with each chromosome possessing one long arm and one short arm separated by a middle "pinch point" known as a centromere.

Every living thing has a specified number of chromosomes in each somatic cell. A corn cell has 20; a mouse, 40; a gibbon, 44; and a human, 46. Germ cells in humans, however, have only 23 chromosomes each so that during the union of the male and female gametes, the total will be the standard human number of 46 (23 + 23). [Of these, 22 pairs are numbered in approximate order of size from the largest (#1) to the smallest (#22), while the remaining pair consists of the sex chromosomes: two large X chromosomes in women, one X and one small Y in men.] As a result, genes end up being inherited in pairs consisting of one portion from the father and one from the mother, thereby ensuring genetic diversity.

An average gene consists of about 1,000 nucleotides [see Figure 1 on the next page] that normally appear in triplets such as AGC or ATG (see Perloff, 1999, p. 72). While most triplets specify amino acid production, some function as a "stop" command, just as a telegram might contain "stop" to end a sentence. All living organisms–humans, animals, and plants–depend on this code for their existence. Furthermore, each gene is the blueprint the cell uses to assemble a protein that is composed of a long necklace of amino acids (with each protein consisting of a distinct sequence of those amino acids). [A typical protein contains approximately 300 amino acids (see Macer, 1990, p. 2).]

Thanks to the progress that has been made in both genetics and molecular biology, we now possess techniques by which it is possible to determine the exact chemical sequence of any gene from any organism. The **genotype** is the com-

plete set of genes that the organism possesses–something determined at the time of conception for multicellular organisms. It is the same in all cells of an individual organism. The genotype of all cells derived from a particular cell will be the same, unless a mutation occurs. [It is estimated that 90% of all

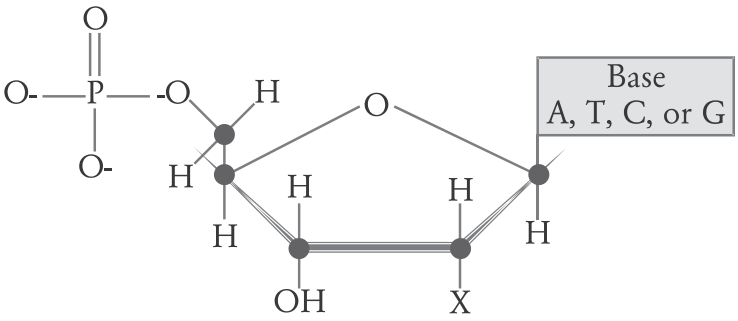

Figure 1 — The structure of a nucleotide. Circles represent carbon atoms. In DNA the sugar is deoxyribose, with a hydrogen atom at position X; in RNA the sugar is ribose, with a hydroxyl (OH) group at position X. In DNA, the base can be A,G,C, or T; in RNA, the base can be A,G,C, or U.

known gene mutations occur in autosomal chromosomes (as opposed to sex chromosomes–see Macer, 1990, p. 4).] For organisms that reproduce sexually, the **genotype** of each new individual will be different since the genes from the two parents are combined. The **phenotype** of an individual is determined by the constant interaction of their genotype and the environment.

The DNA molecule truly is amazing, but it still has certain built-in limits. As geneticist Richard Lewontin remarked: "DNA is a dead molecule, among the most nonreactive, chemically inert molecules in the living world" (2000, p. 141). Matt Ridley referred to DNA as "a helpless, passive piece of mathematics, which catalyses no chemical reactions" (1999, p. 17). What is the point of such statements? Jonathan Wells has explained:

> Although molecular biology has demonstrated conclusively that DNA carries the genetic code for the amino acid sequences of proteins, this is not sufficient to specify a whole organism. Combining DNA with all the ingredients necessary for protein synthesis does not make a cell.... Molecular biology has shown that an organism's DNA specifies the building materials. It turns out, however, that **the assembly instructions are largely in other components of the cell**, and that the floor plan has not yet been discovered. So there are clearly other factors involved in heredity and development besides DNA (1998, pp. 62,64).

[This information will become important in separating fact from fiction in the discussion below on the Human Genome Project.] Strictly speaking, of course, DNA is not actually a **self**-replicating molecule. As Lewontin explained:

> DNA has no power to reproduce itself. Rather it is produced out of elementary materials by a complex cellular machinery of proteins.... The newly manufactured DNA is certainly a **copy** of the old, and the dual structure of the DNA molecule provides a complementary template on which the copying process works...[but] no living molecule is self-reproducing (2000, p. 142, emp. in orig.).

DNA **does** replicate, however. And the process by which it does so is an enormously complex one with many different components that interact to ensure the faithful transfer of genetic information to the next generation. Biochemist Michael Behe noted:

> A large number of parts have to work together to that end. In the absence of one or more of a number of the components, DNA replication is either halted completely or significantly compromised, and the cell either dies or becomes quite sick (1998, p. 185).

What, then, is involved in reproducing the DNA molecule so that it can be passed from cell to cell and generation to generation?

Once the structure of DNA finally was elucidated, scientists discovered how, during cell division, the DNA is replicated to produce a genome for each new daughter cell. The secret lies in the pairing of the bases–A to T, and G to C. During the replication process, the two complementary strands of DNA "unzip" down the middle. A new strand then begins to form alongside each of the originals, laying in an A wherever there is an opposing T, a T where there is an A, a G to a C, and a C to a G. The end result is two new double-stranded portions of DNA that, in most instances, are identical to the originals in their base sequences [see Figure 2]. Ridley described the process by comparing the genetic material to a book.

> The genome is a very clever book, because in the right conditions it can both photocopy itself and read itself. The photocopying is known as **replication**, and the reading as **translation**. Replication works because of an ingenious property of the four bases: A likes to pair with T, and G with C. So a single strand of DNA can copy itself by assembling a complementary strand with Ts opposite all the As, As opposite all the Ts, Cs opposite all the Gs and Gs opposite all the Cs. In fact, the usual state of DNA is the famous **double helix** of the original strand and its complementary pair intertwined.
>
> To make a copy of the complementary strand therefore brings back the original text. So the sequence ACGT becomes TGCA in the copy, which transcribes back to ACGT in the copy of the copy. This enables DNA to replicate indefinitely, yet still contain the same information.

> Translation is a little more complicated. First the text of a gene is **transcribed** into a copy by the same base-pairing process, but this time the copy is made not of DNA but of RNA, a very slightly different chemical.... This RNA copy, called the **messenger RNA, is then edited....**
>
> **The messenger is then befriended by a microscopic machine called a ribosome**, itself made partly of RNA. The ribosome moves along the messenger, translating each three-letter codon in turn into one letter of a different alphabet, an alphabet of twenty different **amino acids**, each brought by a different version of a molecule called **transfer RNA**. Each amino acid is attached to the last to form a chain in the same order as the codons. When the whole message has been translated, the chain of amino acids folds itself up into a distinctive shape that depends on its sequence. It is now known as a **protein**.
>
> Almost everything in the body, from hair to hormones, is either made of proteins or made by them. Every protein is a translated gene (1999, pp. 6,7,8, emp. in orig.).

Yes, the process described above is utterly amazing. But no less amazing is the fact that it takes place in a DNA fiber that is only two millionths of a millimeter thick (barely visible under an electron microscope). Yet the amount of information contained within it "is so immense in the case of human DNA that it would stretch from the North Pole to the equator if it was typed on paper, using standard letter sizes" (Gitt, 1997, p. 90). As Anderson commented: "If the tightly coiled DNA strands inside a single human adult were unwound and stretched out straight, they would cover the distance to the moon half a million times. Yet when coiled, all the strands could fit inside a teaspoon" (1980, p. 50).

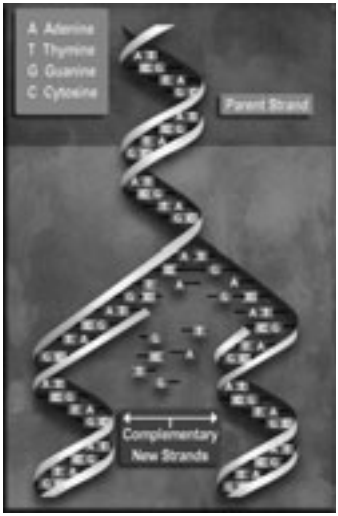

Figure 2 — DNA shown in double-helix, parent-strand form (top), and during replication of two new complementary strands (bottom). Source: DOE Human Genome Program [on-line], http://www.ornl.gov/hgmis.

The DNA molecule must be incredibly stable, since the genetic information stored within it may need to function in a living organism for up to a century or more. It also must be completely reproducible so that its complex informational content can be passed successfully from generation to generation. As it turns out, DNA does, in fact, possess each of these traits, and thereby fulfills the necessary and essential criteria of stability and replicability. Are we to be convinced, however, that all of this occurred merely **by chance**?

Sir Fred Hoyle concluded that the notion that such complexity could be arrived at by chance is "nonsense of a high order" (1981, 92:527). In their textbook on the origin of life, Thaxton, et al., addressed the implications of the genetic code.

> We know that in numerous cases certain effects always have intelligent causes, such as dictionaries, sculptures, machines and paintings. We reason by

> analogy that similar effects have intelligent causes. For example, after looking up to see "BUY FORD" spelled out in smoke across the sky we infer the presence of a skywriter even if we heard or saw no airplane. We would similarly conclude the presence of intelligent activity were we to come upon an elephant-shaped topiary in a cedar forest.
>
> In like manner an intelligible communication via radio signal from some distant galaxy would be widely hailed as evidence of an intelligent source. Why then doesn't the message sequence on the DNA molecule also constitute *prima facie* evidence for an intelligent source? After all, DNA information is not just analogous to a message sequence such as Morse code, it **is** such a message sequence....
>
> We believe that if this question is considered, it will be seen that most often it is answered in the negative simply because it is thought to be inappropriate to bring a Creator into science (1984, pp. 211-212, emp. in orig.).

The intricate and complex nature of the DNA molecule–combined with the staggering amount of chemically coded information that it contains–speaks unerringly to the fact that this "supermolecule" simply could not have come into existence due to blind chance and random natural forces operating through eons of time, as evolutionists have claimed. This is not an adequate explanation for the inherent complexity of the DNA molecule. Andrews was correct when he stated:

> It is not possible for a code, of any kind, to arise by chance or accident.... A code is the work of an intelligent mind. Even the cleverest dog or chimpanzee could not work out a code of any kind. It is obvious then that chance cannot do it.... This could no more have been the work of chance or accident than could the "Moonlight Sonata" be played by mice running up and down the keyboard of my piano! Codes do not arise from chaos (1978, pp. 28-29).

Indeed, codes do not arise from chaos. Obvious design demands a designer. And that is the very point the theist is stressing: an intelligent Designer is demanded by the available evidence.

The Body's Tissues

In the human body, there are numerous tissues (e.g., muscle tissues, nerve tissues, etc.). In fact, a single human has nearly 700 muscles (containing about six billion muscle fibers), composing about 40% of the body's weight (Gillen, 2001, p. 47). I.M. Murray, professor of anatomy at the State University of New York, referred to muscles as the body's "engines" that provide the power for movement (1969, p. 22). Some muscles are tiny, such as those regulating the amount of light entering the eye, while others, like those in the legs, are massive.

Muscles may be classified either as "voluntary" (i.e., under the control of the human will), or "involuntary" (i.e., not under control of the will). The voluntary muscles of the arms, for example, are attached to the bones by tough cords of connective tissue called tendons. One must "think" in order to move these muscles. The involuntary muscles are those whose contraction and relaxation cannot be controlled consciously (e.g., the heart and intestines). Some muscles are both voluntary and involuntary (e.g., the muscles controlling the eyelids, and the diaphragm). There are three types of muscle tissue: (1) skeletal (voluntary muscles that generally are attached to bones); (2) cardiac (red-colored involuntary muscles that are fast-acting and powerful); and (3) smooth (involuntary muscle cells that are found in walls of blood vessels, the digestive tract, etc. and that are slow-acting). All muscles, in one way or another, are regulated by the nervous system.

Muscles work by contracting (tightening). When they contract, they shorten, thereby exerting a "pull" (muscles do not "push"). Frequently, muscles work in pairs or groups, with the overall function of muscles being motion. The biceps in the

upper arm pulls the forearm forward, whereas the triceps moves the forearm downward. While one works, the other rests. These groups of muscles power all actions of the body, ranging from the delicate threading of a needle to the lifting of a heavy object like a piano. The design inherent in such tissues is utterly amazing.

Some muscles, like those attached to the skeleton, are analogous to strong steel cables. Each muscle is constructed of long cells combined in small bundles called fibers. These bundles are bound together, making larger bundles of which the whole muscle consists. Muscle fibers vary in size from a few hundred-thousandths of an inch, to an inch or inch-and-a-half in length. Each muscle has its own stored supply of high-grade fuel, especially sugar (glycogen), which the body has manufactured from food that has been consumed. This analogy may be helpful. In an automobile engine, the spark ignites vaporized gasoline, the piston moves, and keeps moving in response to a series of explosions. "A muscle performs the functions of both the spark and the piston; the cell itself splits a molecule of fuel and also exerts the resulting physical power" (Miller and Goode, 1960, p. 23). If it is clear that an automobile engine was intelligently designed, why is it not reasonable to draw the same conclusion with reference to muscles? Lenihan, even though an evolutionist, wrote: "The body's engines [muscles–BT]...demonstrate some surprisingly modern engineering ideas" (1974, p. 43). The question is: Who initiated these "modern engineering ideas"? The answer, of course, is the Great Designer, God.

Connected to the skeletal muscle is a nerve that conveys a signal, telling the muscle when to contract or relax. Obviously, there must be precise orchestration between the skeletal muscle system and the nervous system. Without doubt, their cooperative nature was planned. Some muscles, like those in the stomach, are stimulated to work by means of chemicals known as hormones.

Furthermore, there is a precisely integrated relationship between muscles and bones. Here is just one such example. "As certain muscles increase in strength, they pull harder than before on the bones to which they are attached. With this as a stimulus, bone-forming cells build new bone to give internal reinforcement where necessary" (Shryock, 1968, p. 27). Would this not indicate design?

In his book, *Human Design,* evolutionist William S. Beck hardly could contain himself when he wrote of "the intricate structural organization" of the muscles and tendons in the hand, which are capable of such a wide variety of actions. But "intricate structural organization" indicates design. Beck characterized this phenomenon as "one of evolution's most remarkable achievements" (1971, p. 691). Remarkable indeed! A number of years ago, an article on the human hand appeared in the magazine, *Today's Health*, published by the American Medical Association. Although saturated with evolutionary concepts (e.g., the hand is alleged to have evolved from a fish's fin), the article nevertheless conceded:

> ...If the most gifted scientists cudgeled their brains they probably could not come up with a stronger or more perfect tool for grasping and delicate manipulation than the human hand. And seen **from an engineering standpoint**, the loveliest hand is a highly complex mechanical device composed of muscle, bone, tendon, fat, and extremely sensitive nerve fibers, capable of performing thousands of jobs with precision (Wylie, 1962, p. 25, emp. added).

But something "engineered" requires an **engineer**. That is just sound logic. Alan Gillen wrote concerning the design inherent in the human hand:

> The movement of the hand and fingers of a concert pianist is an awesome sight. The necessity of coordination, timing, and order to play Beethoven's "Fifth

> Symphony" or Bach's "Jesu–Joy of Man's Desire" is a feat that is not accomplished by chance. There is marvelous skill not only in playing the music, but also in the 70 (35 in each hand) separate muscles contributing to the hand movement on the keyboard. The hand has been described as the most sophisticated "tool" in the body. It looks like it was crafted for maximum dexterity and strength in movement. The hand is capable of 58 distinct movements. These movements allow for dexterity and power for a diversity of actions ranging from piano playing and threading of a needle to holding a jackhammer. This amazing diversity of functions is accomplished with the help of muscles in the forearm and wrist. The fingers have no muscles in themselves; the tendons transfer force from muscles in the forearm and palm…. Orthopedic surgeons could write many manuals suggesting various ways to repair hands that have been injured. Yet, there has never been a surgical technique that succeeded in improving the movement of a healthy hand. It frequently takes over a dozen muscles and tendons working together with the opposable thumb to accomplish one movement (2001, p. 52).

Little wonder that Sir Isaac Newton once remarked: "In the absence of any other proof, the thumb alone would convince me of God's existence."

While many living organisms share common muscle activity, there are some muscle movements that are unique to man. These forcefully demonstrate that the human being is not some kind of "evolved animal." Rather, he is a creature "fearfully and wonderfully made" by a Creator. Observe the following quotation from two evolutionists, which no doubt reveals more than these authors intended. Then, ask yourself how scientists can echo these sentiments and still ignore the evidence of design in nature that demands a Designer.

> Only man can combine muscle with intelligence and imagination, plan and purpose, to plow and plant a field, to create a museum masterpiece or the "Gettysburg Address." And only man trains to perform the most highly coordinated forms of bodily motion for their own sake, in the expressive and athletic arts. We applaud this skill in our species every time we clap our hands for a ballerina or a circus aerialist (Miller and Goode, 1960, p. 21).

The Body's Organs

The Skin

The skin, which is the largest single organ of the human body, consists of three areas: (a) the skin layers; (b) the glands; and (c) the nails. There are two skin layers. The outer layer (the epidermis) consists of rows of cells about 12 to 15 deep, and is between 0.07 and 0.12 millimeters thick. The uppermost layers are dead, and are being replaced constantly with newly formed living cells. It would be an interesting question to ask: What manmade house replaces its own covering? The epidermis contains a pigment called melanin, which gives the skin its distinctive color.

The lower layer (the dermis), which consists mainly of collagen-rich connective tissue, is a spongy, leathery area with a thickness of between one and two millimeters. It serves to protect and cushion the body, and also contains hair follicles, sweat glands, sebaceous glands, and nerve endings, as well as capillaries and lymphatic vessels. It is joined to the epidermis by a corrugated surface that contains nerves and blood vessels.

Receptors (from the Latin *receptor*, meaning "recorder") are the ends of nerve fibers that can detect stimuli and convert them into neural impulses to be sent to the brain via the central nervous system. Incredible amounts of information can be detected by the receptors. The physiological term for

the transmission of information by means of receptors is "sensibility" (from the Latin *sensibilis*, meaning "observable"). Huge numbers of receptors are located in the skin, in structures like muscles and skeletal joints, and in internal organs. Although we "touch" with our epidermis, it is in the dermis that the sense of touch actually is recorded and passed on to the central nervous system.

The skin, as turns out, is a very busy place. In his book, *The Wonder of Man*, Werner Gitt described one square centimeter of skin as containing the following: 6,000,000 cells, 100 sweat glands, 10 sebaceous glands, 5,000 sensory corpuscles, 200 pain points, 25 pressure points, 12 cold-sensitive points, and 2 heat-sensitive points (1999, p. 41). If the skin of a 150-pound man were spread out, it would cover approximately 20 square feet of space, and would make up about one-sixth of a person's average body weight. Human skin is one of the body's most vital organs. Its value may be summarized as follows.

(1) The skin is a protective fortification that keeps harmful bacteria from entering the human system.

(2) It is a waterproof wall that holds in the fluids of the body (our bodies are about 75% fluids).

(3) It protects the interior parts of the body from cuts, bruises, etc.

(4) With its pigment, melanin, it shields the body from harmful rays arriving on the Earth from the Sun. Beck referred to melanin as "an epidermal light filter" (1971, p. 745). Do light filters invented by man require intelligence?

(5) The skin's many nerve endings make it sensitive to touch, cold, heat, pain, and pressure. Thus, it is a major sense organ.

(6) The sweat glands help eliminate waste products and also function in cooling the skin.

(7) The oil glands lubricate the skin and help keep it soft–while at the same time providing a waterproofing system. Though soft, the skin is quite durable. When a 2,000-year-old Egyptian mummy was fingerprinted, the ridges were found to be perfectly preserved (Guinness, 1987, p. 132).

(8) About one-third of the body's blood circulates through the skin. The blood vessels, by contracting and expanding, work to regulate body temperature. If body temperature increases by 7 or 8 degrees, and remains there for any length of time, a person almost always will die. The skin is thus a radiator system (see Brand and Yancey, 1980, p. 154). Does a radiator happen by accident?

(9) The skin absorbs ultraviolet rays from the Sun, and uses them to convert chemicals into vitamin D, which the body needs for the utilization of calcium. The skin is therefore a chemical-processing plant for the entire body.

(10) And, as odd as it may sound, skin also performs a respiratory function, handling between one and two percent of the gas exchange of the body.

The ends of the fingers and toes are protected by a horn-like substance, usually referred to as the fingernail or toenail. Actually, most of the nail is dead; only the lower, crescent-shaped, white portion is living. The fingernails grow about three times as fast as the toenails, which is certainly evidence of good design, considering the respective functions of the hands and feet. The skin of the underside of the fingers, the palms, and the soles of the feet have a special friction surface, and no hair. These areas, like the knurling on a tool handle or the tread of a tire, have been designed specifically for gripping.

Hair has several functions. It is a part of the body's sentry system. Eyelashes warn the eyes to close when foreign objects strike them. Body hairs also serve as levers, connected to mus-

cles, to help squeeze the oil glands. Hair acts as a filter in the ears and nose. Hair grows to a certain length, falls out, and then, in most instances, is replaced by new hair. Hair is "programmed" to grow only to a certain length. But who provided the "program"? Compared to most mammals, man is relatively hairless. But why is this the case? A strong case can be made for the fact that the best explanation is to be found "in the design of the human body with personhood in view" (Cosgrove, 1987, p. 54). In fact, it has been estimated that touching is ten times as strong as verbal or emotional contact. Strong emotions can be aroused via the sense of touch. A tender kiss or caress at a romantic moment, a gentle hug during a time of grief, or a slap in the face, all have the ability to arouse various emotions. And, of course, in the end, if the sense of touch were not pleasant, procreation would not occur.

Skin is a highly responsive sense organ that can detect a large number of stimuli at once, all the while keeping them separate and distinct. The softness of a rabbit's fur, the roughness of a masonry brick, the smoothness of a piece of glass, the warmth of a sauna, the thorns of a rose, or the searing pain associated with a burn are all things that the skin can detect and identify. Man has yet to develop a durable material that can perform the many functions that the skin carries out on a daily basis. Does it make sense to suggest that the skin "just happened"? We think not.

The Eye

One of the most forceful evidences of design within the human body is the eye. Even Charles Darwin struggled with the problem of an organ so complex as the eye evolving via naturalistic processes. In *The Origin of Species*, he admitted:

> To suppose that the eye with all its inimitable contrivances for adjusting the focus to different distances, for admitting different amounts of light, and for the cor-

> rection of spherical and chromatic aberration, could have been formed by natural selection, seems, I freely confess, absurd in the highest sense (1859, p. 170).

However, in spite of his misgivings, Darwin went on to argue that the eye had, in fact, been produced by natural selection through an evolutionary process. Darwin, of course, is not the only one to be troubled by what appears to be obvious evidence of design in the eye. Robert Jastrow once wrote:

> The eye is a marvelous instrument, resembling a telescope of the highest quality, with a lens, an adjustable focus, a variable diaphragm for controlling the amount of light, and optical corrections for spherical and chromatic aberration. **The eye appears to have been designed; no designer of telescopes could have done better**. How could this marvelous instrument have evolved by chance, through a succession of random events? (1981, pp. 96-97, emp. added).

Though Dr. Jastrow argued that "the fact of evolution is not in doubt," he nonetheless confessed: "...there seems to be no direct proof that evolution can work these miracles.... **It is hard to accept the evolution of the eye as a product of chance**" (1981, pp. 101,97,98, emp. added).

Considering how extremely complex the mechanism of the eye is known to be, it is easy to understand why Dr. Jastrow would make such a comment. Although it accounts for only one four-thousandth of the average adult's body weight, it processes approximately 80% of the information received from the outside world. In fact, the eyes can handle 500,000 messages simultaneously. In an average day, the eye moves about 100,000 times, using muscles that, milligram for milligram, are among the body's strongest. The body would have to walk 50 miles to exercise the leg muscles an equal amount. Interestingly, the eyes are kept clear by tear ducts that produce exactly the right amount of fluid to cleanse both eyes simultaneously in one five-hundredth of a second.

The eye can be divided functionally into two distinct parts. The first is the physical "dioptric" mechanism (from the Greek *dioptra*, meaning something through which one looks), which handles incoming light. The second is the receptor area of the retina where the light triggers processes in the nerve cells. To form an image, the incoming light rays (arriving at approximately 186,000 miles per second) must be refracted (bent) and focused sharply on the retina. The retina itself is a masterpiece of engineering design. As Gitt noted:

> One single square millimetre of the retina contains approximately 400,000 optical sensors. To get some idea of such a large number, imagine a sphere, on the surface of which circles are drawn, the size of tennis balls. These circles are separated from each other by the same distance as their diameter. In order to accommodate 400,000 such circles, the sphere must have a diameter of 52 metres, nearly, three times as large as the hot air balloons used for advertising promotions (1999, p. 15).

The cornea takes care of most of the refraction, and the lens serves to focus items seen at varying distances as it changes its curvature. The iris and the pupil work together (like the light-meter and diaphragm of a camera) to let in just the right amount of light. There are two opposing sets of muscles that regulate the size of the aperture (the opening, or pupil) according to the brightness or dimness of the incoming light. The images move through a lens that focuses the "picture" (in an inverted form) on the retina (which covers less than a square inch) at the rear of the eyeball. The image is then picked up by some 137 million light-sensitive receptor cells that convey the message (at over 300 miles per hour) to the brain for processing. Those cells [130 million rods (that allow the eye to see in black and white) and 7 million cones (that allow the eye to see in full color)] convert light into chemical (and subsequently into chemical) signals, which then travel along the optic nerve to the brain.

This "dioptric mechanism" produces miniaturized and upside-down images, which, as it turns out, also are left-right inverted. But the optic nerves from both eyes split up and cross each other in such a way that the left halves of the images of both eyes are received by the right hemisphere of the brain, and the right halves end up in the left hemisphere. Each half of the observer's brain receives information from only one half of the image. As Gitt went on to explain:

> Note that, although the brain processes the different parts of the image in various remote locations, the two halves of the field of vision are seamlessly reunited, without any trace of a joint–amazing! This process is still far from being fully understood (p. 17).

Amazing indeed! Little wonder that secular writers are prone to speak of "the miraculous teamwork of your eye and your brain" (Guinness, 1987, p. 196). In fact, the vocabulary of such writers becomes rather unguarded when contemplating this phenomenon. Bioengineer John Lenihan has suggested: "The eye is an exceptionally sensitive optical instrument **displaying many striking features of design** and performance; even the windscreen washers and wipers have not been forgotten" (1974, p. 75, emp. added). Since Dr. Lenihan is an evolutionist, his terminology cannot be dismissed as some kind of creationist jargon.

It is no wonder that the eye frequently is compared to a camera. Evolutionists Miller and Goode suggested: "The living camera of the eye photographs fleeting images by the thousands, between one moment and the next, and it makes its own adjustments, automatically and precisely, with each change in distance light, and angle" (1960, p. 315). The eye does indeed photograph "fleeting images by the thousands." It can take and develop approximately half a million pictures a day (Gardner, 1994, p. 105). The eye is infinitely more complex than any manmade camera. Actually, the camera was

patterned after the eye–a fact admitted even by evolutionists. The Time-Life science series volume, *The Body*, spoke of the camera as a "man-made eye" and conceded that this optical instrument was "modeled" after the design of the eye (Nourse, 1964, p. 154). Indeed, as the information in the chart below documents, the eye does display many striking features of design.

THE EYE	THE CAMERA
Eyelid	Lens cover
Lens	Lens
Close-up	Close-up
Wide-angle	Wide-angle
Telephoto	Telephoto
Ciliary muscle + lens	Autofocus
Iris + pupil	Light meter
Retina	Film
Rods	Black and white
Cones	Color
Brain	Processing

If the function of the camera demands that it was "made," does it not stand to reason that the more complex human camera, the eye, also must have had a Maker? As the ancient proverb says: "There is none so blind as those who will not see."

The Ear

Another incontrovertible evidence of design within the human body is the ear, which is composed of three areas: outer, middle, and inner. Sound waves enter the outer ear (at

a speed of 1,087 feet per second) and pass along a tube to the middle ear. Stretched across the tube is a thin membrane, the eardrum. The sound waves hit this tissue and cause it to vibrate. The resulting vibrations then are passed on by three tiny bones (the smallest in the human body, connected and operated by miniature muscles)–the malleus, incus, and stapes (bones popularly known as the hammer, anvil, and stirrup, respectively, because of their shapes).

These bones, which one authority says "are **designed** to transmit even very faint sounds," (Sedeen, 1986, p. 280, emp. added), are connected to another membrane called the oval window. As the oval window vibrates, it generates movement within a small spiral passage, the cochlea, which is filled with a highly viscous liquid known as endolymph. The vibrations within the cochlea are picked up by some 25,000 auditory receptors and transferred as electrical impulses, by means of the auditory nerve (with its 30,000 nerve fibers) to the brain. The brain receives these vibrations (up to 25,000 per second) and interprets them as voice, thunder, music (more than 1,500 separate musical tones), or as the thousands of other sounds that humans hear on a daily basis. The complexity of this integrated system is nothing short of phenomenal. One writer noted: "Amazingly, the inner ear, although no bigger than a hazelnut, contains as many circuits as the telephone system of a good-sized city" (Guinness, 1987, p. 208). Would anyone suggest that a city's telephone system could design itself? Dr. Lenihan even went so far as to remark that the "level of sensitivity" within the human ear is "far beyond the achievement of any microphone" and "represents the ultimate limit of performance" (1974, p. 87).

There are two additional tubes on either side of the cochlear duct, which are partially filled with a somewhat less viscous fluid (known as perilymph). Nerve endings from these canals are connected to the brain, which, in cooperation with the

muscle system, helps us maintain our equilibrium. The balancing ability of the auditory system has been compared to the "inertial system used in missiles and submarines" (Lenihan, p. 90). Thus, the ear mechanism actually is designed to accomplish two functions–hearing and balance. This feature of the body demonstrates incredible planning. In the words of Lenihan, "The combination, in such a small space, of the hearing and balancing systems of the body **represents a remarkable achievement of biological engineering**" (p. 94, emp. added). Does "blind nature" have the ability to carry out such "remarkable achievements of biological engineering"?

The psalmist affirmed that God "planted the ear" and "formed the eye" (Psalm 94:9). Hearing and seeing are not developments of an eons-long evolutionary process. "The hearing ear, and the seeing eye, Jehovah has made even both of them" (Proverbs 20:12). "Our eyes and ears are transformers. They sense the light and sounds around us and turn them into electrical impulses that the brain can interpret. **Each organ is designed** to handle its own medium" (Sedeen, 1986, p. 276, emp. added). Designed indeed! And such design speaks eloquently of a Grand Designer.

The Body's Systems

The Skeletal System

The average adult has 206 bones in his body (an infant has more than 300, but many of these fuse during the maturation process). The human skeleton accounts for about 15% of the body's weight, and works in tandem with 600 muscles and 100 joints. [Tendons that anchor the muscles to the bones have been known to withstand a stress of eight tons per square inch! Blanchard, 2000, p. 312.] There are two major classifications of bones. **Axial bones** are the 80 bones that lie along the central, vertical axis of the body and that support and protect the

head and torso. They include the skull and the spinal column. **Appendicular bones** include the 126 bones that comprise the appendages, including the shoulders, hips, arms, legs, hand, feet, fingers, and toes. There are four major classification groups in regard to the shape of bones: (1) **long bones** (such as the radius, humerus, and femur); (2) **short bones** (like the carpals and tarsals); (3) **flat bones** (such as the sternum and skull bones); and (4) **irregular bones** (like the vertebrae). Bones serve several important functions.

(1) Bones provide a rigid support system for the organs and tissues of the body. They are like the interior framework of a house. The skeletal system is "something of an **engineering marvel**, strong enough to support weight and carry burdens, yet flexible to cushion shocks and allow for an extraordinary variety of motion" (Miller and Goode, p. 25, emp. added). Who was the engineer responsible for the marvel known as the skeletal system?

(2) Bones function as protective devices for many of the softer parts of the anatomy. For example, certain sections of the skull, which are independent in infancy but have grown together in the adult, offer protection for the fragile brain. The 12 pairs of ribs form a cage to shield the heart and lungs. The backbone (called the spinal column) is made up of 33 block-like bones that are ingeniously designed to allow movement, yet these bones protect a major feature of the nervous system–the spinal cord.

(3) Bones also serve as levers. In his book, *Body by Design*, Alan Gillen remarked:

> Our skeletal frames are more than just scaffolding that holds us erect; they serve as the structures upon which we hang all that we are. Our bones are the anchors to which muscles attach, and they act as the levers and fulcrums for our daily activities (2001, p. 41).

Miller and Goode noted:

> When our muscles move us about, they do it by working a series of articulated levers that make a most efficient use of every ounce of muscular motive power. The levers are the bones of the body's framework, fitted together with the neatness of jigsaw pieces and hinged by joints that must win the admiration of any mechanic (p. 25).

(4) Bones even have a metabolic function. Gillen commented: "Bones are far from rigid, lifeless structures. Nerves etch their surfaces; blood vessels interweave them. Bones bustle with metabolic activity. Break one and you will immediately understand how sensitive they can be" (p. 41). Part of each major bone is dense, and part (the marrow) is spongy. Until fairly recently, it was assumed that bones were inert tissue. However, studies have revealed that they are "constantly being remodeled" (Beck, 1971, p. 626). They provide a reservoir of essential minerals (99% of the calcium and 88% of the phosphorus, plus other trace elements), which must be rebuilt continuously. For example, without calcium, impulses could not travel along the nerves, and blood would not clot. Too, red blood cells (180 million of which die every minute), certain white blood cells, and platelets (that help the blood to clot) arise in the marrow of the bones (the marrow produces one trillion red blood cells daily; see Gardner, 1994, p. 108). Incredibly, when a bone is broken, it immediately begins to repair itself. And, after the repair process is complete, it will be even stronger than it was before. Brand and Yancey commented:

> Perhaps an engineer will someday develop a substance as strong and light and efficient as bone, but what engineer could devise a substance that, like bone, can grow continuously, lubricate itself, require no shutdown time, and repair itself when damage occurs? (1980, p. 91).

In order for the skeletal system to be effective, it must have several attributes, among which are strength, elasticity, and lightness of weight. Amazingly, the bones possess all of these characteristics. A cube of bone 1 square inch in surface will bear, without being crushed, a weight of more than 4 tons. Ounce for ounce, bone is stronger than solid steel. And yet, a piece of bone will stretch 10 times as much as steel. A steel frame comparable to the human skeleton would weight 3 times as much. The long bones in the arms and legs have a lengthwise hollow in the shaft that gives strength without adding extra weight. Alexander Macalister, former professor of anatomy at Cambridge University, suggested: "Man's body is a machine formed for doing work. Its framework is the most suitable that could be devised in material, structure, and arrangement" (1886, 7:2).

As a specific example of bone design, consider the bones of the foot. One-fourth of all the body's bones are in the feet. Each human foot contains 26 bones. The feet have been designed to facilitate a number of mechanical functions. They **support**, using arches similar to those found in an engineered bridge. They operate as **levers** (as in those occasions when one presses an automobile accelerator peddle). They act like **hydraulic jacks** when a person tiptoes. They **catapult** a person as he jumps. And feet act as a **cushion** for the legs when one is running. All of these features are quite helpful–especially in view of the fact that an average person will walk about 65,000 miles in his/her lifetime (equivalent to traveling around the world more than two-and-a-half times). Brand and Yancey observed:

> Even when a soccer player subjects these small bones to a cumulative force of one thousand tons per foot over the course of a match, his living bones endure the stress, maintaining their elasticity.... Our body weight is evenly spread out through architecturally perfect arches which serve as springs, and the bending of knees and ankles absorbs stress (1980, p. 70).

The skeletal system demonstrates brilliant design, to be sure. The conclusion is inescapable that there must have been a brilliant Designer behind it. Jay Wile put it like this:

> …[D]espite the amazing technology that can be designed and created by us today, we cannot make a machine that can do even a fraction of what you can do with your own body! Nevertheless, if you do not believe in God, you have to assume that this incredible machine that we call the human body–a machine that far surpasses anything our best applied scientists can build–had to have been the result of **random chance**. After all, without God, you have to believe that the human body is the product of evolution, and evolution occurs by random chance. If our greatest applied scientists cannot build anything that comes anywhere close to performing the functions of the human body, how likely is it that the human body evolved by chance? In my opinion, the answer is "no chance whatsoever" (2000, pp. 268-269, emp. in orig.).

The Circulatory System

The circulatory system consists of the heart, blood, and arteries, vessels, and capillaries, and has several important functions. First, the circulatory system transports digested food particles to the various parts of the body. Second, it takes oxygen to the cells for burning food, thereby producing heat and energy. Third, it picks up waste materials and carries them to the organs that eliminate refuse from the body as a whole.

The heart is a small muscle (or, as some would say, two muscles connected in tandem) in the upper chest cavity. Renowned heart surgeon Michael DeBakey once called it a "busy machine" that pumps blood to all parts of the body (1984, 9: 132a). In the adult male human, the heart weighs about 11 ounces, and is about the size of a large fist; a woman's heart is

slightly smaller. Miller and Goode have described this marvelous muscle as a "pump with a **built-in** motor" (1960, p. 63, emp. added). The question comes to mind: Is it not the case that something **built** always has a **builder**?

The heart is the strongest muscle in the body. Normally it beats (in an adult) at about 70 to 80 times per minute. When the body needs an extra supply of blood (e.g., during vigorous exercise), it can beat 150 to 180 times a minute—an automatic regulating feature that clearly indicates design. Note this unwitting testimony from an evolutionist.

> The heart and blood vessels do more than speed or slow our blood flow to meet [the body's] needs. They carry the scarlet stream to different tissues under differing pressures to fuel different actions. Blood rushes to the stomach when we eat, to the lungs and muscles when we swim, to the brain when we read. To satisfy these changing metabolic needs, the cardiovascular system **integrates information as well as any computer, then responds as no computer can** (Schiefelbein, 1986, p. 124, emp. added).

The heart can exert tremendous force. It can squirt a stream of blood about 10 feet into the air. In the span of a single hour, the heart generates enough energy to lift a medium-sized car 3 feet off the ground (Avraham, 1989, p. 13). It beats about 100,000 times a day, or nearly 40,000,000 times in a year. It pumps approximately 1,800-2,000 gallons of blood a day (enough to fill over 40 bathtubs!), or about 680,000 gallons a year (see Gillen, 2001, p. 70). In a lifetime, a heart will pump some 600,000 metric **tons** of blood! Physicians have suggested that if it were kept healthy and not abused, a human heart could beat for 120 years without structural failure.

The heart is a high-capacity pump that also is self-lubricating. A tough sac called the pericardium sheaths the heart. Membranes within the pericardium secrete a lubricating fluid that permits the pericardium to slide smoothly against the

heart's surface as the cardiac muscles contract and relax. Interestingly, although the heart itself is continually filled with blood, it nevertheless requires its own blood supply to provide oxygen and nutrients to the hard-working cardiac muscles. Located on the surface of the heart, the branches of the coronary arteries penetrate its wall. The coronary veins collect blood from the capillaries in the heart muscles, and carry it back to be used again–a circulatory route that happens to be the shortest in the entire body.

But what causes the heart to "pump" or "beat"? It contains a small patch of tissue called the sinus node, or cardiac pacemaker. Somehow, about every 8/10 of a second, it produces an electrical current (a sort of "jump-start") to certain nerve fibers that stimulate the muscular contractions that send the blood flowing (at up to 10 miles per hour) throughout the body. To accomplish its varied tasks, the atria and ventricles must contract and relax using a highly regulated and strictly coordinated series of actions known as the "cardiac cycle." Nerves stemmed from the medulla oblongata automatically control this cycle. The stage of the cardiac cycle where the heart relaxes and fills with blood is known as diastole, while the pumping and contracting stage is known as systole. Each cardiac cycle is perceived as a "heartbeat," which is regulated by autonomic (i.e., involuntary) control. The heart is not only self-lubricating, but also self-regulating. The blood requirements for the body's tissues and organs are not constant, but depend on activity levels, overall health, amount of stress, state of consciousness (i.e., awake or asleep), etc. Accelerator nerves link the heart to the central nervous system, and transmit signals to heart's pacemaker, which can increase the heart rate as needed.

To look at it, the heart appears somewhat like a rounded-off cone, the base of which is known as the cardiac base. The septum separates the two halves of the heart, the right half serving the pulmonary circulation, while the left half inde-

pendently pumps blood all over the body. Oxygen-depleted blood from the body is received by the right half of the heart and passed on to the lungs where it is oxygenated. It then flows to the left side of the heart where it is pumped in various directions to the rest of the body.

Obviously, there are numerous impressive design features within the heart. But few of them are as impressive as the system of valves put in place to prevent back-flow of blood in the heart. These valves work flawlessly to keep blood flowing in the right direction. The two main valves are known as the bicuspid valve (or mitral valve) and the tricuspid valve, which are held in position by strong tendinous cords that are attached to the ventricle walls by cone-shaped papillary muscles. These cords keep the cuspid valves from everting (think of how an umbrella is blown "inside out" in a strong gust of wind). Known collectively as the atrioventricular valves (or A-V valves), these valves separate the atria and the ventricles of the heart.

And how is the blood able to make its way, against gravity, back up the veins to the heart? The veins, it turns out, also contain their own one-way valves with open ends that face the heart–analogous to the valves in an automobile engine (Miller and Goode, p. 71). The blood is pushed partially upward by force from the heart, but it also is propelled by muscle movements that massage the veins, pushing the blood forward through the valves.

Blood is being continuously pumped into, and out of, the heart with its rhythmic beating. The difference between arteries and vessels is not determined by the quality or quantity of blood they carry, but by its flow direction to or away from the heart. Arteries carry blood **from** the heart; veins carry blood **to** the heart. A human adult has between 60,000 and 100,000 miles' worth of various types of blood vessels. Capillaries are the smallest yet most abundant of the blood vessels, being microscopic in size. It has been estimated that it would take ten of them tied together to equal the thickness of a sin-

gle human hair, and about 120 short capillaries to measure 3 inches. All of them laid end-to-end, however, would circle the equator twice (Avraham, p. 40). Some ten billion capillaries snake through the tissues and, although they contain at any given time less than 5% of the body's entire blood supply, they bring blood within the reach of every one of the 120 trillion cells that compose a normal adult. The blood is pumped into the capillaries with a force sufficient to drive the plasma and its rich cargo through the porous walls of these tiny vessels, thus re-nourishing the surrounding cells. This procedure requires a very "precise balance of pressures between the blood flowing within their walls and the fluid in and around the body's cells" (Schiefelbein, p. 114). Capillaries have thin walls (a mere one-cell thick!), across which gases and waste products also are exchanged. Gillen described the process as follows:

> As blood flows through the capillaries in the lungs, it changes from venous blood to arterial blood by diffusing carbon dioxide out and oxygen in. The color of blood changes in the process from a deep crimson to a bright scarlet. As blood flows through tissue capillaries, it changes back from arterial blood to venous blood. The oxygen leaves the blood to enter cells, and carbon dioxide and other wastes leave the cells and enter the blood. Capillaries converge to form venules and then further converge to form veins (2001, p. 72).

The system is so efficient that the entire process of circulation, "during which every cell in the body is serviced, takes only a total of 20 seconds" (Avraham, p. 41). The body's skillfully constructed transportation system clearly evinces design, hence a Designer. Lenihan confessed: "The circulation is an example of a multipurpose system, often found in the body but **generally beyond the capability of the engineering designer**" (p. 5, emp. added). In describing the heart, Werner Gitt observed:

> The focal point of circulation, it responds to every demand, even from the most distant corners of the body. The larger blood vessels, arteries, and veins are the main roads carrying the necessary volumes of blood, but the capillaries provide the actual nourishment. In this **cleverly designed network**, the arteries branch repeatedly and supply the entire capillary network with blood. These capillaries in turn combine to form larger and larger veins (1999, p. 54, emp. added).

Notice the phraseology used by scientists to describe the heart and circulatory system. Gitt described it as a "cleverly designed network." Evolutionists Miller and Goode conceded that "for a pump that is keeping two separate circulatory systems going in perfect synchronization, **it is hard to imagine a better job of engineering**" (1960, p. 68, emp. added). They likewise admitted that it is "hard to describe as anything short of a **miracle**" (p. 64, emp. added). Is "nature" an "engineer" that performs "miracles"? Hardly. Medical authorities have observed that the heart's efficiency (i.e., the amount of useful work in relation to fuel expended) is about twice that of a steam engine (see Lenihan, p. 131). If intelligence was required to invent the steam engine, does it not stand to reason that intelligence lies behind the human heart? Gitt acknowledged: "The human heart is morphologically and functionally a masterpiece of its Creator" (p. 54). Indeed it is. The question is: Who is the Creator?

Fifteen centuries before Christ was born, Moses declared: "The life of the flesh is in the blood" (Leviticus 17:11). This inspired truth was uttered more than 3,000 years before English physician William Harvey (1578-1657) discovered the circulatory system. Actually, blood is classified as a tissue. The body contains about 5 to 6 quarts of this liquid tissue. The blood consists of plasma (which is mostly water), salts, a protein called fibrinogen, antibodies (which help fight dis-

ease), enzymes, and hormones. The plasma helps maintain chemical balance in the body, regulates the body's water content, and assists in controlling temperature.

The blood also contains solid materials–red cells (erythrocytes), white cells (leucocytes), and platelets. The 25 trillion erythrocytes transport oxygen throughout the body, and carry carbon dioxide back to the lungs (via the heart). Leucocytes (5 different kinds) are the body's defensive army, and attack bacteria and other foreign invaders. Platelets (15 million in a single drop of blood) are the body's repairmen, and help the blood to clot when the body is damaged.

Harmful bacteria and worn-out cells are filtered out of the bloodstream by the liver and the spleen. The kidneys also remove waste products from the blood system. The blood has a very effective garbage disposal system. But in order for blood to accomplish its vital work, it must remain at a relatively constant temperature. A radical drop in body temperature can damage the cells, and if the temperature rises above 108°F, one cannot survive for long. Amazingly, however, there is a thermostat in the brain that monitors the temperature of the blood as it flows through that organ. When the air temperature drops, the heart slows down and the blood vessels constrict, forcing the liquid tissue to flow deeper within the body where it can remain warm. When the weather gets warm, or when we exercise, the arterioles open and the blood is dispersed within the skin, effectively functioning like a radiator (see Schiefelbein, p. 128).

There is somewhat more to Moses' declaration that "the life of the flesh is in the blood," however. Red blood cells can carry oxygen due to the fact that they contain hemoglobin, and are the right shape. Normal erythrocytes are almost uniform in size, and have a shape referred to as biconcave (think of a piece of Lifesavers™ candy). This particular configuration allows for maximum surface contact of hemoglobin with

the cell, thus greatly facilitating the exchange of blood gases. Furthermore, this shape provides the red blood cell with amazing flexibility and elasticity, which allows the cells to "fold" as they move through the very narrow capillaries. In addition, the smooth, rounded edges reduce the amount of friction that the cell encounters during the circulatory process.

Erythrocytes are able to carry oxygen because they contain hemoglobin (it is the oxygen attached to the hemoglobin molecules that give red blood cells their characteristic red color). A hemoglobin molecule consists of four protein chains known as globins, each of which is bound to one "heme" (a red-pigmented molecule). Each heme contains an atom of iron that can combine with one molecule of oxygen. Thus, the hemoglobin found in a red blood cell can transport up to four molecules of oxygen. Considering that each erythrocyte contains approximately 280,000,000 molecules of hemoglobin, a single red blood cell can transport over a billion molecules of oxygen–molecules that are picked up in the lungs as the blood is re-routed there after returning to the heart in a deoxygenated form (Gillen, 2001, p. 76). If there were any fewer molecules of hemoglobin in each erythrocyte, there would not be enough residual oxygen to sustain our life after, say, a hard sneeze or a hefty pat on the back. Without question this delicately balanced system affirms intricate design–which implies a Designer.

We might also note, while we are on this subject, that medical scientists, in the interest of extending human longevity, have attempted to fashion numerous artificial organs. All such efforts have met with only limited success. As one authority noted: "...no synthetic spare part–however well engineered–can match the capacity of the organ a normal human being is born with" (Mader, 1979, p. 367). Miller and Goode admitted that "no engineering genius has invented a pump like the human heart" (p. 6). Pierre Galletti of Brown Medical School

described artificial body parts as "simplistic substitutes for their sophisticated natural counterparts" (as quoted in Cauwels, 1986, p. ix). Man can attempt to duplicate the Grand Designer's handiwork, but he never can hope to approach the wisdom and skill of the Creator. Consider just one example.

On December 13, 2001, Abiomed, a medical-technology company, posted a press release on their Web site announcing the death of a second AbioCor™ artificial heart recipient. This announcement came just thirteen days after the announcement that the first patient enrolled in the AbioCor™ clinical trial had died. In light of these heart-rending events, it is important for us to contemplate the bigger picture. Can man make a replacement heart that works, and if not, why not? The quest to design and manufacture an artificial heart started during World War II. During this period, medics often were called upon to remove shell fragments from soldiers, and a value suddenly was placed on a heart replacement.

During the 1950s and 1960s, key developments such as the heart/lung machine, internal pacemakers, and replacement valves were made. However, a polyvinyl chloride device made by physicians Willem Kolff and Tetsuzo Akutsu sustained the life of a dog for only 90 minutes–not exactly a success by any measure. In 1965, Dr. Kolff and his team developed a silicone rubber heart to be used in a calf. The first artificial heart to be implanted into a human was designed by physician Domingo Liotta, and was used as a bridge for a heart-transplant recipient. The patient survived for almost three days with the artificial heart, and 36 hours more with a transplanted heart.

William DeVries implanted the first Jarvik-7, a device developed by William Kolff, Donald Olsen, and Robert Jarvik. Clinical evaluations of the Jarvik-7 began in 1982, when this artificial heart was placed in dentist Barney Clark at the University of Utah. Five implants were performed through 1985.

The longest survivor was William Schroeder, who was supported by the Jarvik-7 for 620 days. By the late 1980s, surgeons at 16 centers, including the Texas Heart Institute, had implanted more than 70 Jarvik-7 devices in patients as a bridge to transplantation. While they were hemodynamically stable, patients implanted with the Jarvik-7 did suffer from many complications (hemorrhage, stroke, sepsis, etc.). Additionally, they were forced to live a restricted lifestyle with little autonomy apart from the external console.

So now the AbioCor™ has entered the picture. The AbioCor™ Implantable Replacement Heart is made of plastic and titanium and, weighing less than 2 pounds, is powered through the skin by an external battery pack. On October 12, 2000, the Abiomed Company that produces the AbioCor™ artificial heart announced that it had received a $1.8 million federal contract. That same year, the company's employee base was expanded to more than 200, and it completed a $96 million public offering on the stock market.

With the millions of dollars used to produce this new heart, and the countless hours of research and development that were required, one would expect that this artificial heart was nothing less than a state-of-the-art wonder! A lab full of highly specialized technicians and physicians would seem to ensure success. However, Robert Tools, the first patient to receive an AbioCor™ heart, lived only 151 days. The individual who received the fourth implant (and who, according to his own wishes and those of his family, never has been identified to the public) survived only 56 days.

Why is that? Haven't evolutionists reminded us time and again that humans evolved over time from some amoeba-like creature? Isn't the human heart just another product of evolution? It would seem as though creating something that merely evolved over time would not be all that complex (after all, we can put water fountains in skyscrapers). **And yet**

millions of dollars, dozens of highly educated researchers, and countless hours of work, can extend life only a hundred days or so. Could it be that we have not given God enough credit for His ability to design and create the amazing human body? Manmade artificial hearts may hold a small bit of promise, but for now we will cling to that which God made in the beginning (Psalm 139:14). Some struggle to avoid such a conclusion, but at times they admit that:

> If, like the scientists of an earlier day, we assumed a constant guiding purposefulness in our biological universe, we might say that the capillary system is the purpose of the circulation, that the entire system, heart and all, **was designed for just this end** (Miller and Goode, 1960, p. 77, emp. added).

The Nervous System

Consider this simple test. Read the following sentence: *Mom had hot apple cider ready for us on that cold snowy day.* In the seconds that were required for you to complete the sentence, your brain already had carried out a multitude of tasks. Initially, your eyes focused on the piece of paper on which the sentence was written, and then transmitted the visual stimuli chemically via your optic nerve to your brain. The brain received that chemical signal, and immediately recognized the symbols on the page as English letters. It then compiled those letters into an entire sentence (using rules that you learned long ago in elementary school), which it analyzed and comprehended. In addition, your brain also may have painted a mental image of this snowy day and your mother. You may even have found yourself suddenly craving a mug of hot apple cider. Also during that short span, your ears reported any unusual sounds and your nose constantly was sampling the air for new odors. All the while, your brain was keeping your body at homeostasis–that is, it signaled your heart to beat

and your lungs to respire, it measured hormone levels in your blood stream (and made adjustments as needed), and relayed any pain or sensation that you might be feeling during those few short seconds. And all of this is merely the proverbial "tip of the iceberg." The brain, and the nerves associated with it, carry out countless physiological functions, most of which we understand at only a very basic level. Again, truth be told, we have yet to understand exactly how this unique organ can perform all of these functions simultaneously and with such marvelous precision.

And therein lies the enigma surrounding the brain. How can we take three pounds of matter, and in that small space cram all of our education, memories, communication skills, emotions, likes, and dislikes–yet, all the while it is those same three pounds of matter that keep our heart beating, cause our lungs to respire, and give us a detailed internal map of the position of our arms or legs? How is it that a certain smell instantaneously can carry us back to a period in our childhood, offering us crystal clear images of that particular time in our life? Exactly how is it that we can distinguish between a banana and an orange, just by using our nose? What chemical reactions occur to tell us which one is an orange? **Where** is that memory stored, and how long will that memory **remain** stored? What part of our brain controls our emotions? Where do we hold feelings such as love and hate? How is it that the sound of one voice can bring tears of joy, while sounds from another can cause our blood pressure to begin to climb? In fact, why is it that humans love at all?

As vexing as these questions are, they are even more troubling for individuals who espouse that the brain arrived here by Darwinian mechanisms. Evolutionists would like us to believe that the brain is nothing more than an advanced computer–it receives input (via the senses), and after the input makes its way through various neuronal circuits, output is

the end result. Input equals output. In their book, *The Amazing Brain*, Robert Ornstein and Richard Thompson speculated: "What exists as only a few extra cells in the head of the earthworm, handling information about taste and light, has evolved in us humans into the incredibly complex and sophisticated structure of the human brain" (1984, p. 22). These sentiments no doubt are shared by thousands of individuals who stand in utter awe of the brain, yet who chalk up its existence to pure happenstance. Is the brain merely the product of evolution, or were humans created differently than animals?

The nervous system is the "communication center" of the body, and consists of: (1) the **brain**; (2 the **spinal cord**; and (3) the **nerves**, which spread out from the brain and spinal cord to all parts of the body, somewhat like the root system of a tree. The nervous system has many functions. It regulates the actions of organs like the muscles, liver, kidneys, etc. It monitors the senses, such as seeing, hearing, feeling, etc. It also controls our thinking, learning, and memory capabilities.

The specialized nerve receptors in the sensory organs receive information from the environment. To chose just one example, in the skin there are some 3 to 4 million structures sensitive to pain. There are a half-million touch detectors and more than 200,000 temperature gauges. These tiny receptors, plus those in the eyes, ears, nose, tongue, etc., constantly send data to the brain. This information is transmitted (at up to 45 feet per second, or 30 miles per hour), via the nerve fibers to the brain. The transmission involves both electrical and chemical energy. The brain analyzes the data and determines the appropriate action to be taken. Noted science writer, John Pfeiffer, an evolutionist, has called the nervous system "the most elaborate communications system ever devised" (1961, p. 4). **Who** devised it? A number of years ago, the prestigious journal, *Natural History*, contained this statement: "The

nervous system of a single starfish, with all its various nerve ganglia and fibers, is more complex than London's telephone exchange" (Burnett, 1961, p. 17). If that is true for the nervous system of the lowly starfish, what could be said about the infinitely more complex nervous system of the human?

Those three pounds of "matter" represent literally billions of interconnected nerve cells and millions of protective glial cells–which, according to evolutionists, arose by the effects of time, natural law, and chance from nonliving matter. The brain has been estimated to contain 100 billion (10^{11}) neurons (Kandel, 1991, p. 18), each a living unit within itself. While most neurons share similar properties, they can be classified into "perhaps as many as 10,000 different types" (p. 18). Over 100 thousand billion electrical connections are estimated to be present throughout the human brain, which has been said to be more than "all the electrical connections in all the electrical appliances in the world." In describing this awesome organ, R.L. Wysong wrote:

> The human brain weighs about three pounds, contains ten billion neurons with approximately 25,000 synapses (connections) per neuron. Each neuron is made up of 10,000,000,000 macromolecules. The human mind can store almost limitless amounts of information (a potential millions of times greater than the 10^{15} bits of information gathered in a lifetime), compare facts, weigh information against memory, judgment and conscience and formulate a decision in a fraction of a second (1976, p. 340, parenthetical item in orig.).

The brain, arguably, is the most unique organ in the entire body–not merely because of its physical make-up, but because of **what** it does and **how** it does it. As evolutionist George Bartelmez put it many years ago: "Only a single fundamental organ has undergone great specialization in the genus *Homo*. This is the brain" (1926, p. 454). Today, from an evolutionary

perspective, that assessment still is viewed as correct. As Johanson and Edgar noted seventy years later: "This change in both size and shape represents one of the most remarkable morphological shifts that has been observed in the evolutionary history of any mammal, for it entailed both an enhanced cranial capacity and a radical reorganization of brain proportions" (1996, p. 83).

We believe that the brain deserves a great deal more respect than evolutionists are willing to afford it. The late evolutionist Isaac Asimov characterized the human brain as "the most complex and orderly arrangement of matter in the universe" (1970, p. 10). When Paul Davies, professor of mathematics and physics at the Universe of Adelaide, referred to it as "the most developed and complex system known to science" (1992b, 14[5]:4), he did not overstate the case. Sherwin Nuland, in *The Wisdom of the Body*, wrote in regard to the human brain:

> Though the three pounds represent a mere 2 percent of the body weight of a 150-pound person, the quartful of brain is so metabolically active that it uses 20 percent of the oxygen we take in through our lungs. To supply this much oxygen requires a very high flow of blood. Fully 15 percent of the blood propelled into the aorta with each contraction of the left ventricle is transported directly to the brain. Not only does the brain demand a large proportion of the body's oxygen and blood but it also begins its life requiring an equivalent share, or even more, of its genes. Of the total of about 50,000 to 100,000 genes in *Homo sapiens*, some 30,000 code for one or another aspect of the brain. Clearly, a huge amount of genetic information is required to operate the human brain.... From all of this emerges the brain's overarching responsibility—it is the chief means by which the body's activities are coordinated and governed (1997, pp. 328,346).

James Trefil addressed the brain's complexity when he wrote:

> The brain is a physical system. **It contains about 100 billion interconnected neurons–about as many neurons as there are stars in the Milky Way galaxy**…. In the end, by mechanisms we still haven't worked out (but we will do so!), these signals are converted, by neurons in different parts of the brain, into the final signals that produce images or smells or sounds… (1996, pp. 217-218, parenthetical item in orig., emp. added).

Notice Trefil's admission that the brain works "by mechanisms we still haven't worked out." Ian Tattersall, in his book, *Becoming Human*, wrote in a similar fashion in describing the brain's marvelous sophistication–while admitting that "there's a huge amount that we don't know."

> [T]he brain is an extremely power-hungry mechanism that, because of its size, monopolizes some 20 percent of our entire energy intake…. But the matter doesn't rest there, for sheer brain size is far from the full story. **The organization–the structure–of our brains is also unique, and it is this that appears to hold the ultimate key to our remarkable cognitive powers**. There's a huge amount, of course, that we don't know about how the brain works and especially about how a mass of chemical and electrical signals can give rise to such complex effects as cognition and consciousness (1998, pp. 69,70, emp. added).

The point in Dr. Tattersall's last sentence is well taken. There is a "**huge amount that we don't know**"–including (among other things) how "a mass of chemical and electrical signals can give rise to such complex effects as cognition and consciousness." [Pardon me if I am a bit skeptical of Trefil's exuberant suggestion, "but we will do so!" On this topic, I agree wholeheartedly with Robert Jastrow of NASA, who admitted:

> Is it possible that man, with his remarkable powers of intellect and spirit, has been formed from the dust of the earth by chance alone? It is hard to accept the evolution of the human eye as a product of chance; it is even harder to accept the evolution of human intelligence as the product of random disruptions in the brain cells of our ancestors.... Among the organs of the human body, none is more difficult than the brain to explain by evolution. The powers that reside in the brain make man a different animal from all other animals (1981, pp. 98-99,104).]

In spite of the fact that "neuroscience is said to be awash with data about what the brain does, but virtually devoid of theories about how it works" (Lewin, 1992, p. 163), there are some things we **do** know.

> The brain, although being **the most complex structure existing on Earth–and perhaps in the Universe**–is a well-defined object: it is a material entity located inside the skull, which may be visualized, touched and handled. It is composed of chemical substances, enzymes and hormones which may be measured and analyzed. Its architecture is characterized by neuronal cells, pathways and synapses. Its functioning depends on neurons, which consume oxygen, exchanging chemical substance through their membranes, and maintaining states of electrical polarization interrupted by brief periods of depolarization (Cardoso, 1997/1998, emp. in orig.).
>
> The brain is a helmet-shaped mass of gray and white tissue about the size of a grapefruit, one to two quarts in volume, and on average weighing three pounds (Einstein's brain, for example, was 2.75 pounds). Its surface is wrinkled like that of a cleaning sponge, and its consistency is custardlike, firm enough to keep from puddling on the floor the brain case, soft enough to be scooped out with a spoon.... **The human genome database accumulated to 1995 reveals that the**

brain's structure is prescribed by at least 3,195 distinctive genes, 50 percent more than for any other organ or tissue… (Wilson, 1998, p. 97, parenthetical item in orig., emp. added).

Some overall descriptions of the properties of the human brain are instructive. For instance, **10 billion neurons are packed into the brain, each of which, on average, has a thousand links with other neurons, resulting in more than sixty thousand miles of writing. Connectivity on that scale is beyond comprehension**, but undoubtedly it is fundamental to the brain's ability to generate cognition. Although individual events in an electronic computer happen a million times faster than in the brain, **its massive connectivity and simultaneous mode of activity allows biology to outstrip technology for speed**. For instance, the fastest computer clocks up a billion or so operations a second, which pales to insignificance beside the 100 billion operations that occur in the brain of a fly at rest…. To say that the brain is a computer is a truism, because, unquestionably, what goes on in there is computation. But so far, no man-made computer matches the human brain, either in capacity or design…. Can a computer think? And, ultimately, can a computer generate a level of consciousness… (Lewin, 1992, pp. 160,163, emp. added).

The human brain's increase in neurons is due to its greater size, not to greater density, since humans have only about 1.25 as many neurons per cubic centimeter as chimpanzees do. There are approximately 146,000 neurons per square millimeter of cortical surface. The human brain has an area of about 2,200 square centimeters and about 30 billion neurons (more than assumed until quite recently). The chimpanzee and the gorilla have brains of about 500 square centimeters, and with about 6 billion neurons (Ornstein, 1991, p. 63, parenthetical item in orig.).

Can anyone–after reading descriptions (and admissions!) such as these–really believe that the human brain is "only another organ" as Michael Lemonick claimed in *Time* magazine (2003a, 161[3]:66)? Not without denying the obvious! In the January 16, 1997 issue of *Nature*, Sir Francis Crick's close collaborator, Christof Koch, wrote: "The latest work on information processing and storage at **the single cell (neuron) level reveals previously unimagined complexity and dynamism**" (385:207, parenthetical item in orig., emp. added). His concluding remarks were: "As always, we are left with a feeling of awe for the amazing complexity found in Nature" (385:210). Amazing complexity indeed!

A case in point is British evolutionist Richard Dawkins. In the preface to his book, *The Blind Watchmaker*, he discussed the brain's incredible complexity and "apparent design," and the problem posed by both.

> The computer on which I am writing these words has an information storage capacity of about 64 kilobytes (one byte is used to hold each character of text). The computer was consciously designed and deliberately manufactured. The brain with which you are understanding my words is an array of some ten million kiloneurones. Many of these billions of nerve cells have each more than a thousand "electric wires" connecting them to other neurons. Moreover, at the molecular genetic level, every single one of more than a trillion cells in the body contains about a thousand times as much precisely coded digital information as my entire computer. **The complexity of living organisms is matched by the elegant efficiency of their apparent design. If anyone doesn't agree that this amount of complex design cries out for an explanation, I give up** (1986, p. ix, emp. added).

It is no wonder that Dr. Dawkins was tempted to "give up" trying to explain the intricate design found in nature. It is that very design that is so incredibly evident in the brain.

The human brain consists of three main areas. The cerebrum is the thinking/learning center. It deciphers messages from the sensory organs and controls the voluntary muscles. Evolutionist William Beck spoke of the "architectural plan" characteristic of this region (1971, p. 444). Does not an "architectural plan" require an architect? The maintenance of equilibrium and muscle coordination occurs in the cerebellum. Finally, there is the brain stem, which has several components that control the involuntary muscles–regulating heartbeat, digestion, breathing, etc.

Let us consider several aspects of the brain's uncanny abilities. [Incidentally, human beings, unlike animals, are the only creatures who think about their brains!] The brain's memory storage capacity is incredible. It has been compared to a vast library. Evolutionist Carl Sagan wrote:

> The information content of the human brain expressed in bits is probably comparable to the total number of connections among the neurons–about a hundred trillion, 10^{14} bits. If written out in English, say, that information would fill some twenty million volumes, as many as in the world's largest libraries. The equivalent of twenty million books is inside the heads of every one of us. The brain is a very big place in a very small space (1980, p. 278).

It has been suggested that it would take a bookshelf 500 miles long–from San Francisco, California to Portland, Oregon–to house the information stored in the human brain. Would anyone actually contend that this kind of information content "just happened"? Evolutionists do. A popular science journal employed this analogy.

> The brain is an immense computer with 1^{10} circuits and a memory of perhaps 10^{20} bits, each of these being five to ten orders of magnitude more complex than any computer yet built. It is still more fascinating that the brain performs this work, using only 20 to 25 watts compared to the six and ten kilowatts used by our large computers (Cahill, 1981, 89[3]:105).

One writer has suggested that "many researchers think of the brain as a computer. This comparison is inadequate. Even the most sophisticated computers that we can envision are crude compared to the almost infinite complexity and flexibility of the human brain" (Pines, 1986, p. 326). The Cray-2 supercomputer has a storage capacity about 1,000 times less than that of a human brain. One authority stated that "problem solving by a human brain exceeds by far the capacity of the most powerful computers" (*Encyclopaedia Britannica*, 1989, 2:189).

Walk into any office, hospital, or even grocery store, and you will find yourself in the presence of computers. Computers have become an integral part of everyday life–they even played a part in getting this book to you. But most intelligent individuals will agree that computers did not arrive on this planet by time, natural law, and chance. Computers are designed and manufactured, and they constantly are being improved to increase their speed and capabilities. But the computer fails miserably in comparison to the human brain. When is the last time a computer grabbed a pencil to compose a sonnet, a short story, or a poem? How many computers are capable of taking a piece of wood, fashioning it in the shape of a violin, and then sitting down to play Barber's *Adagio for Strings*. And yet evolutionists insist that the human brain–an object far more complex, and with far more capabilities than a computer–"evolved" in order to provide us with memories, emotions, the ability to reason, and the ability to talk. Other individuals like to "simplify" the human brain down to the level of modern-day computers. They rationalize that, like computers, the human brain can rapidly process, store, and recall bits of information. Also, some scientific investigators compare neuronal connections to the wiring found within computers. However, the inner workings of a computer always can be reduced to one thing–electronics. The basic function of computers always involves the movement of an elec-

trical charge in a semiconductor. The brain, on the other hand, operates purely on electrochemical reactions. The transmission of nerve signals involves chemicals known as neurotransmitters. Once a neuron is caused to fire, it moves these neurotransmitters into the tiny space between itself and the neighboring neurons (at the synapse), in order to stimulate them.

Additionally, we know that the human brain can reason and think–i.e., we possess self-awareness. Computers have the ability to carry out multiple tasks, and they even can carry out complex processes–but not without the programming and instruction they receive from humans. Furthermore, computers do not possess the ability to reason. When asked to translate into Russian the sentence–"the spirit is willing but the flesh is weak"–one computer came up with words that meant "the vodka is fine, but the meat is tasteless" (Allan, 1989, p. 68)–which is a far cry from the original meaning. Nor are computers self-aware. In comparing a modern-day computer to the awesome power of the human brain, astrophysicist Robert Jastrow admitted: "The machine would be a prodigious artificial intelligence, but it would be only a clumsy imitation of the human brain" (1981, p. 143).

It has been estimated that if we learned something new every second of our lives, it would take three million years to exhaust the capacity of the human brain (Weiss, 1990, p. 103). Plainly put, the brain is not just an advanced computer. All those convolutions and neuronal networks are the result of an intelligent Creator. If we are able to rationalize that a computer found in the middle of the Sahara Desert did not just "happen" by random chance, then why are so many willing to believe that a far more complex human brain occurred in such a fashion?

No rational person subscribes to the notion that the computer "just happened by chance" as the result of fortuitous accidents in nature. The computer obviously was designed, and

that demands a designer. Nobel laureate Sir John Eccles, an evolutionist, conceded the design evinced by the brain's amazing memory capacity when he wrote:

> We do not even begin to comprehend the functional significance of this richly complex **design**.... If we now persist in regarding the brain as a machine, then we must say that it is by far the most complicated machine in existence (1958, pp. 135,136, emp. added).

If the less-complicated computer indicates design, what does this say for the infinitely more complex human brain?

In addition to its phenomenal memory capacity, the brain also exhibits extraordinary ability in its orchestration of muscular movements. Suppose you decide that you want to pick up a pen and some paper from your desk. Your brain will have to send signals to your hands, wrists, arms, and shoulders, which will direct the manipulation of 60 different joints and more than 100 muscles. In addition to moving the muscles directionally, the brain regulates the exact force needed for a particular task. Opening the car door of your classic 1937 Chevrolet requires 400 times more torque (turning force) than dialing a rotary-style telephone. Picking up a paper clip requires only a fraction of an ounce of force, whereas pulling on your socks and shoes necessitates about 8 to 12 pounds of force. The brain compensates for multiplied thousands of these kinds of variables in daily life. Too, it does its work efficiently in terms of energy use. One scientist observed that "half a salted peanut provides sufficient calories for an hour of intense mental effort" (Pfeiffer, 1961, p. 102).

One of the astounding features of the brain is its ability to process and react to so many different circumstances at once. While an artist is working on a painting (using his voluntary muscles at the behest of this brain), he can: smell food cooking and know whether it is turnip greens or steak; hear a dog barking and determine if it is his dog or a neighbor's; feel a

breeze upon his face and sense that rain is near; and be reflecting on a warm friendship of the past. Even while all of this is taking place, the brain is regulating millions of internal bodily activities that the person never even "thinks" about.

Logical contemplation of these facts can only lead one to agree with prominent brain surgeon, Robert White, who wrote: "I am left with no choice but to acknowledge the existence of a Superior Intellect, responsible for the design and development of the incredible brain-mind relationship—something far beyond man's capacity to understand" (1978, p. 99). Jastrow himself even admitted: "It is not so easy to accept that theory [Darwin's theory of evolution by natural selection—BT] as the explanation of an extraordinary organ like the brain" (1981, p. 96).

The precision and complexity of our brain, and the manner in which it is able to interact with our mind, clearly point to an intelligent Designer. Writing in the *Bulletin of Atomic Scientists*, professor Roger Sperry, a psychologist at the California Institute of Technology, observed:

> Before science, man used to think himself a free agent possessing free will. Science gives us, instead, causal determinism wherein every act is seen to follow inevitably from preceding patterns of brain excitation. Where we used to see purpose and meaning in human behavior, science now shows us a complex biophysical machine composed entirely of material elements, all of which obey inexorably the universal laws of physics and chemistry…. I find that my own conceptual working model of the brain leads to inferences that are in direct disagreement with many of the foregoing; especially I must take issue with that whole general materialistic-reductionist conception of human nature and mind that seems to emerge from the currently prevailing objective analytic approach in the brain-behaviour sciences. When we are led to fa-

> vour the implications of modern materialism in opposition to older, more idealistic values in these and related matters, **I suspect that science may have sold society and itself a somewhat questionable bill of goods** (1966, pp. 2-3, emp. added)

I suspect so, too. Ornstein and Thompson summed it up well when they stated: "After thousands of scientists have studied it for centuries, the only word to describe it remains **amazing**" (1984, p. 21, emp. in orig.).

And it is not just the brain that is "difficult to explain by evolution." Were space to permit, we could examine numerous other body systems (e.g., digestive, reproductive, etc.), each of which provides clear and compelling evidence of design. Atheistic philosopher Paul Ricci has suggested that "Although many have difficulty understanding the tremendous **order and complexity** of functions of the human body (the eye, for example), **there is no obvious designer**" (1986, p. 191, emp. added). The only people who "have difficulty understanding the tremendous order and complexity" found in the Universe are those who have "refused to have God in their knowledge" (Romans 1:28). Such people can parrot the phrase that "there is no obvious designer," but their arguments are not convincing in light of the evidence at hand.

THE UNBELIEVER'S RESPONSE TO THE ARGUMENT FROM DESIGN

In the past, those who chose not to believe in God denied the existence of any purposeful design in the Universe, and busied themselves in attempting to prove that point. That is why, for example, Richard Dawkins wrote *The Blind Watchmaker*–to argue that there is **no design** apparent in the Universe. Were such design found to exist, the conclusion would be both inescapable and undeniable–there must have been a designer.

It is not an easy task, however, to explain away what the average person can see so readily as compelling evidence of design. There are simply too many striking examples of design in nature, which is teeming with creatures, and features, that can be explained only by acknowledging an intelligent designer. From the macrocosm to the microcosm, inherent design is clearly evident. In their more lucid moments, even unbelievers are struck by it. Evolutionist Douglas Futuyma, for example, ruefully admitted: "We look at the design of organisms, then, for evidence of the Creator's intelligence, and what do we see? A multitude of exquisite adaptations to be sure; the bones of a swallow beautifully adapted for flight; the eyes of a cat magnificently shaped for seeing in the twilight" (1983, p. 198).

Does this mean, then, that unbelievers like Dr. Futuyma have admitted defeat, and now are willing to accept the existence of God? Hardly. Rather than admit the existence of the Creator, they have developed a two-pronged approach to dealing with the theist's argument from design. First, they have developed an argument which suggests that apparent design is just that–apparent, not actual. In other words, features that appear to have been designed can, in actuality, be explained on the basis of adaptation, random chance operating over eons of time, etc.

Second, they have developed an argument intended to draw attention away from apparent design in nature, and to call attention to alleged examples of "non-design" or poor design–which they feel should not be present if an intelligent Designer created the magnificent Universe in which we live. This line of reasoning basically suggests that if design in the Universe **proves** the existence of God, then "non-design" (or poor design) just as emphatically **disproves** the existence of that same God. In logical form, the argument may be stated as follows.

1. If the Universe evinces traits of non-design, there is no Designer.
2. The Universe does evince non-design.
3. Thus, the Universe had no Designer.

In recent years, this argument has grown in popularity. In his book, *Science on Trial*, Futuyma devoted almost an entire chapter to examples of non-design in nature. Other scientists have joined in the fracas as well, not the least of whom was the late Harvard paleontologist Stephen Jay Gould, who wrote extensively about alleged examples of non-design in nature.

As a result of all the attention being given to the matter of design versus non-design, a new phrase has been coined to express the unbeliever's position–the **argument from suboptimality**. This idea suggests that if all design were considered perfect, everything would be **optimal**; however, since there are items in nature that (allegedly) are imperfect, there is **suboptimality** in nature. [NOTE: The argument also is known as the argument from dysteleology.] It is my contention that the argument is flawed for several reasons.

First, in arguing the case for design, creationists are not obligated to show **obvious** design in every single feature of the Universe. It is necessary to produce only a reasonable number of sufficient evidences in order to establish design. **For the evolutionist to produce an example of something which, to him, evinces either non-design, or poor design, does not somehow magically negate all the other evidences of obvious design!**

Second, it is possible that an object possesses purposeful design, but that it is not recognized by the observer. Consider the following two cases. Percival Davis, in the book he coauthored with Wayne Frair, *A Case for Creation*, provided the following illustration.

> My daughter was playing with her pet rat one day when a question occurred to her. "Daddy," she said, "why does a rat have scales on its tail?"
>
> "You know perfectly well," I replied. "The reptiles that were ancestral to rats and all other mammals had scales on their tails as well as on the rest of their bodies. Because there was no particular disadvantage to having them, they persisted in rats to this day."
>
> "Quit putting me on, Daddy. I know you don't believe that!"
>
> You cannot win, it seems. But it is true that one is hard put to discern the reason for the manifold adaptations that organisms possess. What I should have said to my daughter (and eventually did say) was that God had put the scales there for reasons He knew to be perfectly good ones but which may take us a lot of research to discover, since He has not told us what they are. Still, the fact was that I could not explain the presence of those scales... (Frair and Davis, 1983, pp. 30-31).

Dr. Davis has raised two very important points with this simple story. First, we may not know **presently** why an organism is designed the way it is. To us, the design is either not yet recognizable, or not yet well understood. Second, with further research, the heretofore unrecognizable design eventually may be discovered. In fact, in the case which follows, that is exactly what happened.

In his book, *The Panda's Thumb*, Dr. Gould (who was one of suboptimality's most vocal supporters) presented what he believed to be perhaps the finest known example of non-design to be found in nature thus far–the panda's thumb. After providing an exhaustive explanation of how the panda has 5 other digits on each "hand," which function quite well in the panda's everyday life, Dr. Gould then provided an equally exhaustive explanation of the panda's "thumb." It is, he said, "a some-

what clumsy, but quite workable" appendage that "wins no prize in an engineer's derby." His whole essay was intended to portray this as good evidence of suboptimality–i.e., non-design in nature. In fact, lest the reader miss his point, Gould said that "odd arrangements and funny solutions are the proof of evolution–paths that a sensible God would never tread, but that a natural process, constrained by history, follows perforce" (1980, pp. 20-21).

Interestingly, while Dr. Gould was writing about the non-design that he felt was so evident, research (the same kind of research Dr. Davis suggested was needed to elucidate the purpose of design in certain structures) was ongoing in regard to the panda's thumb. What did that research show? The panda's thumb now has been found to exhibit design for very special functions, as the following information attests.

First, the San Diego Zoo's *Giant Panda Zoobook* states: "In fact, the giant panda is one of the few large animals that can grab things as tightly as a human can" (n.d., p. 6). Second, in 1985 Schaller and co-authors released *The Giant Pandas of Wolong,* in which they wrote: "The panda can handle bamboo stems with great precision by holding them as if with forceps in the hairless groove connecting the pad of the first digit and pseudothumb" (p. 4).

Do these kinds of statements seem to describe the panda's thumb as a "jury-rigged" device? Does being able to grasp something tightly, with great precision, using a pseudothumb that can be compared to surgical forceps seem to convey non-design? Such statements should serve to remind us that an object may indeed possess purposeful design, but that design may not be evident immediately to the observer. Dr. Gould could not see (for whatever reasons) the design in the panda's thumb. Nevertheless, such design is present.

There are other flaws with the suboptimality argument as well. One of the most serious is this: **those who claim that something is "suboptimal" must, by definition, set them-**

selves up as the sole judge of what is, and what is not, "optimal." In other words, those who would claim non-design in nature must know two things: (1) they must know with certainty that the item under discussion evinces positively no design; and (2) they must know with certainty what the absolute standard is in the first place (i.e., "the optimal") in order to claim that something has become "suboptimal."

These points have not escaped evolutionary scientists. For example, S.R. Scadding of Guelph University in Canada has commented that the suboptimality "argument is a theological rather than a scientific argument, since it is based on the **supposed** nature of the Creator" (1981, p. 174, emp. added). That is to say, the unbeliever sets himself up as the Creator, presupposes to know the mind of the Creator, and then presumes to say what the Creator did, or did not, do. Observe how one evolutionist does just that:

> The case for evolution then has two sides; positive evidence–that evolution has occurred; and negative evidence–that the natural world does not conform to **our expectation** of what an omnipotent, omniscient, truthful Creator **would have** created (Futuyma, 1983, p. 198, emp. added).

Notice the phrase, "that the natural world does not conform to **our expectation** of what an omnipotent, omniscient, truthful Creator **would have** created." The atheist, agnostic, or skeptic looks at the creation, sees that it does not fit what **he** would do if **he** were the Creator, and then suggests on that basis that a Creator does not exist. Such thinking makes for an extremely weak argument. As Frair and Davis have remarked: "It could be considered arrogant to assume knowledge of a design feature's purpose in an organism, even if it had a purpose" (1983, p. 31).

There is yet another flaw in this suboptimality argument, which, like the one just discussed, has to do with theology, not science. First, the unbeliever sets himself up as the Cre-

ator, and proceeds to note that since things weren't done as he would do them, there must not be a Creator. Second, however, when the **real** Creator tries to explain why things are as they are, the unbeliever refuses to listen. I would like to offer the following in support of this point.

It is at least possible that an object once clearly reflected purposeful design, but as a result of a process of degeneration, the design has been clouded or erased. Suppose a gardener, digging in a pile of rubbish, discovers an ancient book. Its cover is weathered, its pages are mostly stuck together, the type has faded, etc. It is, for all practical purposes, completely illegible. Does the **current** condition of the book mean that it never had a message–that it never evinced design? Of course not. Though the book is in a degenerative condition, and the message has faded with time, there is no denying that the book, at one point, was quite communicative.

The unbeliever surveys the Earth and finds examples of what he believes are evidences of "suboptimality." Yet in many cases he may be witnessing simply degeneration instead. In fact, that is exactly what the Creator has stated. When man sinned, and evil was introduced to this planet, a state of progressive degeneration commenced. The whole creation suffered as a result of man's sin (Romans 8:20-22). The Hebrew writer, quoting the psalmist, observed that "the earth, like a garment, is wearing out (Hebrews 1:10-11).

This important point also should be noted: the fact that the product of an orderly mechanism is flawed does not necessarily reflect upon either the initial design or the designer. For example, if a machine that manufactures tin cans begins to turn out irregular cans, does this somehow prove the machine had no designer? Must one postulate that the machine's inventor intended for mutilated cans to be produced, or that the machine was imperfectly designed? Surely we can conceive that the failure could be on the part of those who failed to follow the correct procedures for maintaining the machine, or who abused it in some fashion.

When man rebelled against his Maker, the Lord allowed, as a consequence of that disobedience, degenerative processes to begin, which eventually result in death (Romans 5:12). But the fact that we have eye problems, heart failure, diseases, etc., does not negate the impact as a whole that the human body is "fearfully and wonderfully made" (Psalm 139:14). We will not assume, therefore, that because an unbeliever's reasoning ability is flawed, this proves his brain was not designed. The design argument remains unscathed.

Unbelievers, of course, ignore all this. After all, they have already set themselves up as the Creator, and have determined that none of this is the way they would do it. When the real Creator speaks, they are too busy playing the Creator to hear Him. Futuyma has written:

> The creationists admit that species can undergo limited adaptive changes by the mechanism of mutation plus natural selection. But surely an omniscient and omnipotent Creator could devise a more foolproof method than random mutation to enable his creatures to adapt. Yet mutations do occur, and we have experimental demonstration that they are not oriented in the direction of better adaptedness. How could a wise Creator, in fact, allow mutations to happen at all, since they are so often degenerative instead of uplifting? According to the creationists, there is "a basic principle of disintegration now at work in nature" that we must suppose includes mutation. But why should the Creator have established such a principle? Didn't He like the perfection of His original creation (1983, p. 200)?

Dr. Futuyma acknowledged that creationists have tried to get him to see that there is "a basic principle of disintegration now at work in nature." Then he asked: "But why should the Creator have established such a principle? Didn't He like the perfection of His original creation?" This is why we say that

the problem is rooted in theology, not science. Futuyma questions why the Creator enacted this "principle of degeneration," then makes it clear that he has no intention whatsoever of accepting the answer provided by the very Creator he questions. If Dr. Futuyma had studied what the Creator did say, he would have the answer to his question. Yes, the Creator liked His original creation, so much so He pronounced it "very good" (Genesis 1:31).

It was not God's fault that the principle of degeneration became a reality. It was man's fault because the first man wanted, like so many today, to be his own God. Is there a "principle of degeneration" at work? Indeed there is. Might it cause some organisms or structures to have their original message (i.e., design) diminished, or to lose it altogether? Indeed it might. But does that mean that there never was any design? Or, does it reflect poorly on the Designer, proving somehow that He does not exist? In the eyes of the unbeliever, the only possible answer to these questions is a resounding "yes." As Scadding has noted:

> Haeckel makes clear why this line of argument was of such importance to early evolutionary biologists.... It seemed difficult to explain functionless structures on the basis of special creation without imputing some lack of skill in design to the Creator (1981, p. 174).

So, God gets the blame for man's mistakes. And, the unbeliever gets another argument for his arsenal. Here, in a nutshell, is that argument, as stated by British evolutionist Jeremy Cherfas:

> In fact, as Darwin recognized, a perfect Creator could manufacture perfect adaptations. Everything would fit because everything was designed to fit. It is in the imperfect adaptations that natural selection is revealed, because it is those imperfections that show us that structure has a history. If there were no imperfections, there would be no evidence of history, and therefore nothing to favor evolution by natural selection over creation (1984, p. 29).

Henry Morris, speaking specifically about the comments made by Cherfas, offered an interesting observation:

> This is an amazing admission. The main evidence against creation and for evolution is that natural selection doesn't work! If there were no "imperfect" structures in nature, the evidence would all favor creation. No wonder evolution has to be imposed by authority and bombast, rather than reason, if this is its only real evidence! (1985, p. 177).

Yet this is exactly what Gould has suggested: "Odd arrangements and funny solutions are the **proof of evolution**..." (1980, p. 20, emp. added).

The theist, however, is not willing to usurp the Creator's prerogative and, like the unbeliever, tell Him what He can (and cannot) do, or what is (and what is not) acceptable. As Frair and Davis have suggested:

> Yet the creationist lacks the option (open to the evolutionist) of assuming **purposelessness**. Human curiosity being what it is, the creationist will be motivated to inquire concerning the purpose of the universe and all its features. The purpose for most things will not be found. What we do find may, nonetheless, be sufficient justification for the endeavor (1983, pp. 31-32, emp. in orig.).

It is clear that unbelievers are grasping at straws when the argument from suboptimality is the best they can offer. In reality, of course, all of this is nothing new. Darwin, in his *Origin of Species*, addressed essentially the same argument in 1859. Modern unbelievers–desperate to find something they can use as evidence against design in the Universe (and thus against the Designer)–have resurrected it from the relic heaps of history, dusted it off, given it a different name, and attempted to imbue it with respectability while foisting it upon the public as a legitimate response to the argument from design. Once again they have had to set themselves up as the Creator in or-

der to try to convince people that no Creator exists. And, once again, they have failed. One does not get a poem without a poet, or a law without a lawgiver. One does not get a painting without a painter, or a musical score without a composer. And just as surely, one does not get purposeful design without a designer. The design inherent within the Universe–from the macrocosm to the microcosm–is quite evident, and is sufficient to draw the conclusion demanded by the evidence, in keeping with the Law of Rationality, that God does exist.

4

MORALITY AND ETHICS–THE ANTHROPOLOGICAL ARGUMENT

It is a well-known and widely admitted fact that actions have consequences. But no less true is the fact that beliefs have implications–a fact that atheists and theists alike acknowledge. Earlier in this book, I mentioned that humanist Martin Gardner devoted a chapter in one of his books to "The Relevance of Belief Systems," in an attempt to explain that **what a person believes** profoundly influences **how a person acts** (1988, pp. 57-64). In his book, *An Introduction to Christian Apologetics*, the late theist Edward John Carnell remarked:

> It is evident that we must act, if we are to remain alive, but we find ourselves in such multifarious circumstances that it is difficult to know at times whether it is better to turn to the right or better to turn to the left, or better not to turn at all. And, before one can choose a direction in which to turn, he must answer the question, better in relation to **what or to whom**? In other words, if a man is going to act **meaningfully** and not haphazardly, he must rationally count the cost; he must think before he acts. Right judgment, then, and proper actions always go together.... If it has not been evident to men before that we must be guided in our social life by universal and necessary ethical rules, it certainly is clear today (1948, pp. 316,315, emp. in orig.).

The points made by these two authors are well taken. What a person believes **does** influence how a person acts. Yet we **must** act in our daily lives. Furthermore, right judgments and proper actions **do** go together. How, then, shall we choose to do one thing while choosing not to do another? As A.E. Taylor wrote:

> But it is an undeniable fact that men not merely love and procreate, they also hold that there is a difference between right and wrong; there are things which they **ought** to do and other things which they **ought not** to do. Different groups of men, living under different conditions and in different ages, may disagree widely on the question whether a certain thing belongs to the first or the second of these classes. They may draw the line between right and wrong in a different place, but at least they all agree that there is such a line to be drawn (1945, p. 83, emp. in orig.).

But where do we "draw the line"? By what standard (or standards) are our choices to be measured and judged?

One thing is for certain. The choices that we are being required to make today (and the judgments that those actions require on our part) are becoming increasingly complex and far-reaching in their implications. A slew of problems now sits at our proverbial doorstep—each of which requires rational, reasonable answers on how we ought to act in any given situation. Shall we encourage surrogate motherhood? Shall we countenance abortion? Shall we recommend euthanasia? We will not answer these types of questions, or even discuss them meaningfully, by relying merely on our own intuition or emotions. Furthermore, in many instances looking to the past provides little (if any) aid or comfort. In many ways, the set of problems now facing us is entirely different than the set of problems that once faced generations long since gone.

The simple fact is that morals and ethics **are** important. Even those who eschew any belief in God, and consequently any absolute standard of morality/ethics, concede that morality and ethics play a critical role in man's everyday life. In his book, *Ethics Without God*, atheist Kai Nielsen admitted that to ask, "Is murder evil?," is to ask a self-answering question (1973, p. 16). The late evolutionist of Harvard University, George Gaylord Simpson, stated that although "man is the result of a purposeless and materialistic process that did not have him in mind," nonetheless "**good and evil, right and wrong, concepts irrelevant in nature except from the human viewpoint, become real and pressing features** of the whole cosmos as viewed morally because morals arise only in man" (1967, p. 346, emp. added). So far as creatures of the Earth are concerned, morality is a uniquely human trait–a fact that even unbelievers concede. Animals do not operate according to any ethical code. A wolf feels no pangs of conscience when it steals a meal from one of its peers; a cock knows no remorse when mortally wounding another. Men, however, acknowledge the existence of morality and ethics. Wayne Jackson correctly observed:

> All rational people are concerned, to a greater or lesser degree, about human moral and ethical conduct. How we act, and are acted upon, with respect to our fellow man determines the progress and happiness of mankind and, ultimately, contributes in one form or another to human destiny. The existence of, and need for, morality and ethics are self-evident. No sane person will argue that absolutely anything goes. The expressions "ought" and "ought not" are as much a part of the atheist's vocabulary as anyone else's. While it is true that one may become so insensitive that he abandons virtually all of his personal ethical obligations, but he will never ignore the lack of such in those who would abuse him (1995, 15:56).

Thomas C. Mayberry summarized this point well when he wrote: "There is broad agreement that lying, promise breaking, killing, and so on are generally wrong" (1970, 54:113). C.S. Lewis used the somewhat common concept of quarreling to make the same point when he observed that men who quarrel, appeal

> to some kind of standard of behavior which he expects the other man to know about.... Quarreling means trying to show that the other man is in the wrong. And there would be no sense in trying to do that unless you and he had some sort of agreement as to what Right and Wrong are (1952, pp. 17,18).

If: (a) every living person must act from day to day in one way or another–and he must; (b) during the course of our actions, choices must be made–and they must; (c) the range of those choices is broadening every single day–and it is; (d) the scope of both the choices in front of us and the implications of those choices is widening–and it is; and (e) morality and ethics are important–and they are (even to those who believe in no objective, unchanging standard), then by what set of rules, decision-making process, or knowledge system shall human beings determine what they **ought** or **ought not** to do? How shall we come to grips with, and evaluate, these "real and pressing features" of "good and evil, right and wrong"? Stated simply, by what ethical/moral system(s) shall we live and thereby justify our actions and choices?

MORALITY AND ETHICS

As we begin this study into the importance and origin of morality and ethics, a brief definition of terms is in order. The English word "morality" derives from the Latin word *mores*, meaning habits or customs. Morality, therefore, is "the character of being in accord with the principles or standards of right conduct" (Jackson, 1995, 15:50). "Ethics" is from a Greek

word meaning "character." The standard dictionary definition of ethics is "the discipline dealing with what is good and bad or right and wrong; a group of moral principles or a set of values." Ethics, then, "is generally viewed as the system or code by which attitudes and actions are determined to be either right or wrong" (Jackson, 1995, 15:50). Or, as Carnell put it: "Ethics is the science of conduct, and the fundamental problem of ethics is determining what constitutes proper conduct" (1948, p. 315). Moral or ethical philosophy, then, deals with right conduct, ethical duty, and virtue–i.e., how we ought to behave. The question now is: How **ought** we to behave?

If such concepts as "good and evil, right and wrong" are, in fact, "real and pressing features," how, then, should moral and ethical systems be determined? Morals and ethics are universally accepted traits among the human family. Their origin, therefore, must be explained. Simply put, there are but two options. Either morality and ethics are **theocentric**–that is, they originate from the mind of God as an external source of infinite goodness, or they are **anthropocentric**–that is, they originate from man himself (see Geisler and Corduan, 1988, pp. 109-122). Carnell asked in this regard:

> But where shall we locate these rules of duty? **That** is the question. In answering the question, however, one has little latitude of choice. Since duty is proper meaning, and since meaning is a property of either mind or of law, we can expect to locate our rule of duty either in a mind or in a law. **Either the law that rules the mind is supreme, or the mind which makes the law is paramount**. These fairly well exhaust the possibilities, for, if mind does not make the law, it is law that makes the mind. The Christian will defend the primacy of the lawgiver; non-Christianity will defend the primacy of the law... (1948, pp. 320-321, first emp. in orig., last emp. added).

The person who refuses to acknowledge the existence of God does indeed have "little latitude of choice." Simpson was forced to conclude: "Discovery that the universe apart from man or before his coming lacks and lacked any purpose or plan has the inevitable corollary that the workings of the universe cannot provide any automatic, universal, eternal, or absolute ethical criteria of right and wrong" (1967, p. 346).

How do atheism and infidelity explain the origin of morality? Since the unbeliever does not believe that there is an eternal Mind with which goodness is coexistent, i.e., an intrinsically moral Being, obviously he must contend that somehow raw, eternal, inorganic matter was able, by means of an extended evolutionary process, to concoct, promote, and maintain morality. Such a theory is self-defeating for two reasons. First, it wrongly assumes that man, with that evolved mass of cerebral tissue between his ears, somehow is capable of discovering "moral truth." Why should he be? Charles Darwin declared that "there is no fundamental difference between man and the higher mammals in their mental faculties" (as quoted in Francis Darwin, 1889, 1:64). Since man is viewed as little more than the last animal among many to be produced by the long, meandering process of organic evolution, this becomes problematic. No other animal on the long, meandering evolutionary chain can locate and live by "moral truth." Why, then, should we be expected to trust a "naked ape" (to use evolutionary zoologist Desmond Morris' colorful expression) to do any better and be able to formulate an adequate system of ethics? Darwin himself opined: "Can the mind of man, which has, as I fully believe, been developed from a mind as low as that possessed by the lowest animals, be trusted when it draws such grand conclusions?" (as quoted in Francis Darwin, 1889, 1:282). In their book, *Origins*, Richard Leakey and Roger Lewin wrote: "There is now a critical need for a deep awareness that, no matter how special we are **as an animal**, we are still part of the greater balance of na-

ture..." (1977, p. 256, emp. added) A lion is not plagued by guilt after killing a gazelle's infant offspring for its noon meal. A dog does not experience remorse after stealing a bone from one of its fellows.

In 1986, British evolutionist Richard Dawkins [who has described himself as "a fairly militant atheist, with a fair degree of hostility toward religion" (see Bass, 1990, 12[4]:86)] authored a book titled *The Selfish Gene,* in which he set forth his theory of genetic determinism. In summarizing the basic thesis of the book, Dawkins wrote: "You are for nothing. You are here to propagate your selfish genes. There is no higher purpose in life" (Bass, 12[4]:60). Dawkins then explained:

> I am not advocating a morality based on evolution. I am saying how things have evolved. I am not saying how we humans morally ought to behave.... My own feeling is that **a human society based simply on the gene's law of universal ruthless selfishness would be a very nasty society in which to live**. But unfortunately, however much we may deplore something, it does not stop it being true (1989, pp. 2,3, emp. added).

Dawkins is correct in his assessment–a society based on the concept of godless evolution would be "a very nasty" place to live. Since no other animal throughout evolutionary history has been able to locate and live by moral standards, should we somehow trust a naked ape?

Second, matter–by itself–is completely impotent to "evolve" any sense of moral consciousness. In his book, *The Astonishing Hypothesis*, Sir Francis Crick suggested that, eventually, all mind processes will be explicable as nothing more than the firing of neurons–i.e., in terms of interactions between atoms and molecules. The famed linguist from MIT, Steven Pinker, has gone on record as stating: "**Nothing in the mind exists except as neural activity**" (1997, emp. added).

Think for a moment about the implications of what you have just read. Beliefs have consequences! If, to use phrases parroted by various evolutionists: (a) "what we experience as feelings, good or bad, are at the cellular level no more than a complex interaction of chemicals and electrical activity" (Lemonick, 2003a, 161[3]:66,); (b) "mind and body…aren't that different" (Lemonick, 2003b, 161[3]:63); (c) "the mind is a property of the body" and "mind is a man-made concept" (Nuland, 1997, p. 349); (d) "nothing in the mind exists except as neural activity," (Pinker, 1997), **what does all of this mean**?

Let Pinker explain. He believes that "nothing in the mind exists except as neural activity." Would it surprise you to learn, then, that in a *New York Times* article, he suggested that women who murder their newborn babies may not be either mad or evil, but simply unconsciously obeying "primeval instincts to sacrifice their children for the good of the tribe"? (see Blanchard, 2000, p. 382). John Blanchard, in his fascinating book, *Does God Believe in Atheists?*, addressed Dr. Pinker's suggestion: "This is the logical outworking of materialism, **but if reducing the brain's activity to electrical impulses can sanction murder, what can it condemn?**" (p. 382, emp. in orig.).

What indeed? Atheistic philosopher Michael Ruse admitted that if evolution is accepted as true, then "**morality is no more…than an adaptation**, and as such has the same status as such things as teeth and eyes and noses" (1995, p. 241, emp. added). And if, as Ruse went on to say, "morality is a creation of the genes" (p. 290), then by what criterion, or group of criteria, do humans make moral decisions? Have we no option but to do whatever our genes have programmed us to do? In other words, how can the materialist escape from the stranglehold of determinism–the idea which suggests that, as its name implies, everything we do is "determined," and that we have, in essence, no free will.

In the now-famous text of his Compton Lectures, *Objective Knowledge: An Evolutionary Approach*, British philosopher Sir Karl Popper made the point that even if determinism **were** true, it could not be argued, since any argument is itself presumably predetermined by purely physical conditions–as would be any opposing arguments. As Popper put it:

> [A]ccording to determinism, any such theories–such as, say, determinism–are held because of a certain physical structure of the holder (perhaps of his brain). Accordingly, we are deceiving ourselves (and are physically so determined as to deceive ourselves) whenever we believe that there are such things as arguments or reasons which make us accept determinism. Or in other words, physical determinism is a theory which, if it is true, is not arguable, since it must explain all our reactions, including what appear to us as beliefs based on arguments, as due to **purely physical conditions**. Purely physical conditions, including our physical environment, make us say or accept whatever we say or accept… (1972, pp. 223-224, parenthetical item in orig., emp. in orig.).

In their book, *The Wonder of Being Human: Our Brain and Our Mind*, Sir John Eccles and his co-author Daniel Robinson commented on the correctness of Popper's assessment–and the absurd nature of determinism–when they observed: "This is an effective *reductio ad absurdum*" [reduction to the absurd–BT]. They then went on to state: "This stricture applies to all of the materialist theories" (1984, p. 38; cf. also Eccles, 1992, p. 21). Indeed, it **is** absurd. And yes, it **does** apply to "all of the materialist theories."

A good illustration of this is the life, teachings, and actions of the French novelist commonly known as the Marquis de Sade (1740-1814) who gave his name to sadism, in which a person derives sexual satisfaction from inflicting pain and humiliation on others. De Sade argued that, since everything is chemically determined, whatever is, is right. The distin-

guished microbiologist, Lynn Margulis, and her co-author/son Dorion Sagan, discussed this very point in their book, *What is Life?*

> The high-born Frenchman Donatien Alphonse Francois de Sade (1740-1814) keenly felt the vanishing basis for morality. **If Nature was a self-perpetuating machine and no longer a purveyor of divine authority, then it did not matter what he, as the infamous marquis de Sade, did or wrote** (1995, p. 40, emp. added).

Or, as Ravi Zacharias put it: "Thinking atoms discussing morality is absurd" (1990, p. 138).

In his book, *In the Blood: God, Genes and Destiny*, Steve Jones suggested that criminal behavior was determined largely by genetic make-up (1996, pp. 207-220). In discussing Jones' book, one writer, Janet Daley, insisted that if genetics is indeed ultimately responsible for "bad" traits, it also must account for "good" ones. She observed: "If we can never be truly guilty, then we can never be truly virtuous either." Daley went on to say:

> Human beings are only capable of being moral insofar as they are free to choose how they behave. If they have no power to make real choices–if their freedom to decide how to act is severely limited by forces outside their control–then it is nonsense to make any ethical judgements about them. It would be wrong, as well, to base a judicial system on the assumption that people are free to choose how they will act. The idea of putting anyone on trial for anything at all becomes absurd (1996).

In fact, attempting to locate a "basis for morality" in the blind outworkings of nature is futile. As Ruse put it: "There is no justification for morality in the ultimate sense" (as quoted in O'Hear, 1997, p. 140). In Dave Hunt's words, "There are no morals in nature. Try to find a compassionate crow or an

honest eagle–or a sympathetic hurricane" (1996, p. 41). Are those who advocate the idea that "nothing in the mind exists except as neural activity," willing to accept the consequences of their belief?

If there is no purpose in the Universe, as Simpson and others have asserted, then there is no purpose to morality or ethics. But the concept of a "purposeless morality," or a "purposeless ethic," is irrational. Unbelief therefore must contend, and does contend, that there is no ultimate standard of moral/ethical truth, and that morality and ethics, at best, are relative and situational. That being the case, who could ever suggest, correctly, that someone else's conduct was "wrong," or that a man "ought" or "ought not" to do thus and so? The simple fact of the matter is that infidelity cannot explain the origin of morality and ethics.

Whether the unbeliever is willing to admit it or not, if there is no God, man exists in an environment where "anything goes." Russian novelist Fyodor Dostoyevsky, in *The Brothers Karamazov* (1880), had one of his characters (Ivan) remark that in the absence of God, everything is allowed. French existential philosopher, Jean Paul Sartre, wrote:

> Everything is indeed permitted if God does not exist, and man is in consequence forlorn, for he cannot find anything to depend upon either within or outside himself.... Nor, on the other hand, if God does not exist, are we provided with any values or commands that could legitimize our behavior (1961, p. 485).

Sartre contended that **whatever** one chooses to do is right; value is attached to the choice itself so that "...we can never choose evil" (1966, p. 279). These men are correct about one thing. If evolution is true and there is no God, "anything goes" is the name of the game. Thus, it is impossible to formulate a system of ethics by which one objectively can differentiate "right" from "wrong." Agnostic philosopher Bertrand Russell observed:

> We feel that the man who brings widespread happiness at the expense of misery to himself is a better man than the man who brings unhappiness to others and happiness to himself. I do not know of any rational ground for this view, or, perhaps, for the somewhat more rational view that whatever the majority desires (called utilitarian hedonism) is preferable to what the minority desires. These are truly ethical problems but I do not know of any way in which they can be solved except by politics or war. All that I can find to say on this subject is that **an ethical opinion can only be defended by an ethical axiom, but, if the axiom is not accepted, there is no way of reaching a rational conclusion** (1969, 3:29, emp. added).

With no way to reach a rational conclusion on what is ethical, man finds himself adrift in a chaotic sea of despair where "might makes right," where "the strong subjugates the weak," and where each man does what is right in his own eyes. The late atheistic philosopher Ayn Rand even went so far as to title one of her books, *The Virtue of Selfishness–A New Concept of Egoism.* This is not a system based on morals and ethics, but a society of anarchy.

In his book, *Options in Contemporary Christian Ethics* (1981), Norman Geisler discussed various ethical systems that have been proposed by those who have abandoned belief in God. These systems range from no option at all (relativism) to an option no human can resist (determinism)–and, of course, everything in between. Morals and ethics without God is not a pretty picture, as the following investigation of these various systems documents all too well.

Relativism, for example, suggests that there are no universal, objective criteria for determining morals and ethics. Since all value systems are considered to be "culturally derived," all such systems are equally valid; no one system has the right to claim that it is the "correct" system by which men should determine their actions and judge their choices based on those actions. But, as Wayne Jackson has noted,

> ...relativism falls of its own weaknesses, and its proponents will not stay with it. What if a particular culture, e.g., that of the "Bible Belt," believes that ethics is absolute? Would the relativists yield to that? Perish the thought! In some cultures, infanticide has been (or is being) deemed a proper form of population control. Is that then "right"? What about slavery, or the abuse of women? Where is the relativist that will declare openly and publicly the morality of such practices? (1995, 15:53).

Hedonism is the philosophy which argues that the aim of "moral" conduct is the attainment of the greatest possible pleasure with the greatest possible avoidance of pain. In an article titled, "Confessions of a Professed Atheist," Aldous Huxley wrote eloquently about why he, and others of his generation, purposely chose to flout both convention and established moral/ethical principles to "do their own thing":

> I had motives for not wanting the world to have meaning; consequently, assumed it had none, and was able without any difficulty to find satisfying reasons for this assumption.... The philosopher who finds no meaning in the world is not concerned exclusively with a problem in pure metaphysics; he is also concerned to prove there is no valid reason why he personally should not do as he wants to do.... For myself, as no doubt for most of my contemporaries, the philosophy of meaninglessness was essentially an instrument of liberation. The liberation we desired was simultaneously liberation from a certain political and economic system and liberation from a certain system of morality. **We objected to the morality because it interfered with our sexual freedom** (1966, 3:19, emp. added).

Such statements do not leave a whole lot to the imagination. Huxley's goal was to be ready for any sexual pleasure. Humanists of our day have made it clear that they share that goal. One of the tenets of humanism, as expressed in the *Humanist Manifesto* of 1973, suggested:

> [W]e believe that intolerant attitudes, often cultivated by orthodox religions and puritanical cultures, unduly repress sexual conduct. The right to birth control, abortion, and divorce should be recognized. While we do not approve of exploitive, denigrating forms of sexual expression, neither do we wish to prohibit, by law or social sanction, sexual behavior between consenting adults. The many varieties of sexual exploration should not in themselves be considered "evil." Without countenancing mindless permissiveness or unbridled promiscuity, a civilized society should be a **tolerant** one. Short of harming others or compelling them to do likewise, individuals should be permitted to express their sexual proclivities and pursue their lifestyles as they desire (pp. 18-19, emp. in orig.).

What have been the consequences of this kind of thinking? Sexually transmitted diseases are occurring in epidemic proportions. Teenage pregnancies are rampant. Babies are born already infected with deadly diseases such as AIDS because their mothers contracted the diseases during their pregnancies and passed them on to their unborn offspring. In many places divorces are so common that they equal or outnumber marriages. Jails are filled to overflowing with rapists, stalkers, and child molesters. What else, pray tell, will have to go wrong before it becomes apparent that attempts to live without God are futile?

Utilitarianism is the edifice that stands upon the foundation of hedonism. As advocated by J.S. Mill, Jeremy Bentham, and others, it suggests that "good" is that which ultimately gives the greatest amount of pleasure to the greatest number of people. But, as Jackson has noted:

> ...the theory is seriously flawed for several reasons. First, it cannot answer the vital query: If pleasure to the greatest number of people prevents a man from achieving his own personal pleasure, what is there to

> motivate him toward the pleasure of the many? Second, utilitarianism provides no guideline to determine what the "pleasure" (genuine happiness) of the many actually is. Third, it is the philosophy that stands behind, and is perfectly consistent with, numerous atrocities perpetrated in the alleged interest of humanity. When Hitler slaughtered countless millions, and bred people like animals in behalf of evolving his master race, he felt he was operating in the genuine interest of mankind as a whole. The principle is: If some have to suffer in order for the ultimate good to be accomplished, so what? Of course, the leaders of such movements are always willing to step forward with their definition of what that "ultimate good" is! Finally, however, this idea cannot provide any rational reason as to why it would be "wrong" to ignore what is in the interest of the many and, instead, simply pursue one's personal pleasure (1995, 15:51).

The proof of such a point, oddly enough, comes from an intriguing book written by Katherine Tait, the only daughter of renowned British agnostic, Bertrand Russell. In *My Father, Bertrand Russell*, Mrs. Tait described what it was like to live in the Russell household with her brothers. She commented, for example, that her father firmly believed that parents should teach a child "with its very first breath that it has entered into a moral world" (1975, p. 59). But as any evolutionist would, her father had great difficulty in defending such a position. Mrs. Tait recounted in her book the fact that as a child, she would say, "I don't want to; why should I?" when her father told her that she "ought" to do something. She noted that a normal parent might say, "Because I say so," or "because your father says so," or "because God says so." Admittedly, however, Bertrand Russell was not your "normal" parent. He would say to young Katherine, "Because more people will be happy if you do than if you don't." "So what!" she would yell. "I don't care about other people!" "Oh, but you should," her father would reply.

In her youthful naïveté, Katherine would ask, "But why?" To which her father would respond: "Because more people will be happy if you do than if you don't." In the end, however, Mrs. Tait wrote: "We felt the heavy pressure of his rectitude and obeyed, but the reason was not convincing–neither to us nor to him" (1975, pp. 184-185). Would it be convincing–for any rational human being with a smattering of common sense?

Situationism teaches that something is "right" because the **individual** determines it is right on a case-by-case basis, thus invalidating the concept of common moral law applied consistently. The atheistic authors of *Humanist Manifesto II* bluntly affirmed that "moral values derive their source from human experience. Ethics is autonomous and situational, needing no theological or ideological sanction. Ethics stems from human need and interest" (1973, p. 17). Writing in *Science* magazine, one author summarized the matter as follows: "An ethical system that bases its premises on absolute pronouncements will not usually be acceptable to those who view human nature by evolutionary criteria" (Motulsky, 1974, 185: 654). Thus, Simpson wrote:

> The point is that an evolutionary ethic for man (which is of course the one we, as men, seek, if not the only possible kind) should be based on man's own nature, on his evolutionary position and significance.... It cannot be expected to be absolute, but must be subject to evolution itself and must be the result of responsible and rational choice in the full light of such knowledge of man and of life as we have (1967, p. 309, parenthetical comment in orig.).

In his influential book, *Situation Ethics: The New Morality*, Joseph Fletcher argued against the "legalistic" approach to making ethical decisions in which "one enters into every decision-making situation encumbered with a whole apparatus of prefabricated rules and regulations" (1966, p. 18). Thus, for Fletcher (and those who think like him), biblical injunc-

tions are regarded as inconvenient encumbrances. Fletcher went on to argue that if the demands of "love" are better fulfilled by "breaking the rules" in a given set of circumstances, then actions like lying, stealing, and yes, even murder, are justifiable under those circumstances. Simply put, Fletcher argued that there are no absolute "rights" or "wrongs"; instead, each moral decision must be made in light of the specific situation in view.

If a sane man therefore decided it was "right" to kill his business competitors, upon what basis could we (justifiably) ask someone (e.g., the police) to stop him without denying his autonomy and thus violating (and ultimately invalidating) the very principle upon which this ethic is supposed to work? If humans are merely "matter in motion," if no one piece of matter is worth more than any other piece of matter, if we are autonomous, if the situation warrants it, and if we can further our own selfish interests by doing so, could we not lie, steal, maim, or murder at will? Yes indeed. But who would want to live in such a society? As Carnell wrote:

> When Christianity is scrapped, man becomes one minor gear in a mechanical universe; he contributes his little part, just as do mud, hair, and filth. Each is a gear, and each in its own way makes for the smoother movement of the whole. But it is not at all clear that humanity is worthy of any more honor than the other gears in the machine. Why should man be more laudable than, for example, the elephant? Both are doomed to die without hope in a universe which is under the decrees of the second law of thermodynamics, and the animal is bigger than the human. Without God to tell us otherwise, humanity appears to be a huddling mass of groveling protoplasm, crowded together in a nervous wait for death, not unlike a group of helpless children that aggregate together in a burning building, pledging to love each other till the end comes. But, since we are **all** going to die, and since "the wages of

> virtue is dust," as Sidgwick expresses it, what possible incentive for heroic personal living can humanism proffer? Shall **I** give up **my** own desires to follow some abstractly conceived theory of justice, prudence, and benevolence, when, as a result of **my** lifetime sacrifice, all I receive is a dash of dirt? Inasmuch as I can be assured of my happiness here and now if I do my own, rather than the will of the whole, what reason is there for me **not** to follow my own desires? After all, it is just one gear against another, and may the best gear win (1948, pp. 327-328, emp. in orig.).

Determinism is the idea that man is not responsible for his actions. In its early stages, the concept flowed from the teachings of John Watson (1878-1958), a psychologist who taught at Johns Hopkins University. He believed that the long evolutionary process had imbued mankind with certain habits, from which flowed both personality and conduct. Later, psychologist B.F. Skinner of Harvard would inherit the mantle of Watson and become the primary proponent of what was known as "behavioral determinism." Ultimately, said Skinner, the concept of "human responsibility" was so much nonsense since no one was "responsible" in the true sense of the word. Renowned criminal defense lawyer, Clarence Darrow, strongly defended the same position. Once, during a tour of the Cook County jail in Chicago, Illinois, Darrow told the inmates:

> There is no such thing as crime as the word is generally understood. I do not believe there is any sort of distinction between the real moral condition of the people in and out of jail. One is just as good as the other. The people here can no more help being here than the people outside can avoid being outside. I do not believe that people are in jail because they deserve to be. They are in jail simply because they can not avoid it on account of circumstances which are entirely beyond their control and for which they are in no way responsible (1988, p. 58).

In his best-selling book, *Attorney for the Damned*, Arthur Weinberg recounted the story of how Darrow (of Scopes trial fame) used the idea of people ultimately possessing no personal responsibility as a defense ploy for his two rich, young clients, Nathan Leopold and Richard Loeb, who viciously murdered 14-year-old Robert (Bobbie) Franks in cold blood just to see what it was like to kill another human being. Darrow's plea to the judge in a bench hearing on their behalf was that they were in no way responsible for their conduct since their destinies had been shaped for them years earlier by evolutionary forces over which they had absolutely no control (Weinberg, 1957, pp. 16-88). Fortunately, the judge was not swayed by such a specious argument. He found Darrow's two clients guilty, and sentenced them both to life in prison.

In more recent times, Harvard entomologist E.O. Wilson, in his book, *Sociobiology: The New Synthesis*, has suggested that determinism can be documented and studied via the concept known as "sociobiology." This attempted amalgamation between certain of the social sciences and biology propagates the view that man has been "programmed" by his genetics to act as he does. Instead of the refrain made popular in the 1970s by talented comedian Flip Wilson (in character as the hilarious, loud-mouthed "Geraldine"), "The devil made me do it," the mantra for the 1990s became "My genes made me do it!" In assessing such an idea, Wayne Jackson wrote:

> First, if determinism is true, there is no such thing as human responsibility. This is a necessary corollary of the theory. In spite of this, determinists frequently speak, write, and act as though human accountability existed. Consistency is a rare jewel among them. Second, if man is not responsible for his actions, such terms as "good" and "evil" are meaningless. Third, if man is not accountable, no one should ever be punished for robbery, rape, child abuse, murder, etc. Do we punish a machine that maims or kills a person?

> Fourth, how can we be expected to be persuaded by the doctrine of determinism, since the determinists were "programmed" to teach their ideas, and thus these ideas may not be true at all. Fifth, determinists won't abide by their own doctrine. If I recopied Edward *Sociobiology: The New Synthesis*, and had it published in **my** name, I would quickly find out whether Wilson thought I was responsible for the action or if only my genetic background was! (1995, 15:54, emp. in orig.).

THE PRACTICAL IMPACT OF MORALS AND ETHICS WITHOUT GOD

When Martin Gardner wrote on "The Relevance of Belief Systems" in his book, *The New Age: Notes of a Fringe Watcher*, and observed that **what a person believes profoundly influences how a person acts**, he could not have been more right (1988, pp. 57-64). Nowhere has this been more true than in regard to the effect of incorrect beliefs concerning morality and ethics. And what a price we as humans have paid! One example (and there are many) comes to mind immediately in regard to the value (or lack thereof) that we have placed on human life.

Having grown up under a father who was a veterinarian, and personally having served as a professor in the College of Veterinary Medicine at Texas A&M University for a number of years, I have seen firsthand the fate of animals that have suffered irreparable injuries, have become riddled with incurable diseases, or have become too old and decrepit to control their bodily functions. I have had to stand by helplessly and watch my father, or my colleagues, discharge a firearm to end the life of a horse because of a broken leg that could not be healed. I have had to draw into a syringe the life-ending drug to be inserted into the veins of someone's pet dog to "put it to sleep" because the combination of senility and dis-

ease had taken a toll that not even the ablest practitioner of the healing arts could reverse. It is neither a pleasant task nor a pretty sight. But while a pet dog or champion 4-H gelding may have held a place of esteem in a child's heart, the simple fact of the matter is that the dog is not someone's father or mother and the horse is not someone's brother or sister. These are animals–which is why they shoot horses.

In the evolutionary scheme of things, however, man occupies the same status. He may be more knowledgeable, more intellectual, and more scheming than his counterparts in the animal kingdom. But he is still an animal. And so the question is bound to arise: Why should man be treated any differently when his life no longer is deemed worth living? Truth be told, there is no logical reason that he should. From cradle to grave, life–from an evolutionary vantage point–is completely expendable. And so it should be–at least if Charles Darwin is to be taken at face value. In his book, *The Descent of Man*, he wrote:

> With savages, the weak in body or mind are soon eliminated; and those that survive commonly exhibit a vigorous state of health. We civilised men, on the other hand, do our utmost to check the process of elimination; we build asylums for the imbecile, the maimed, and the sick; we institute poor-laws; and our medical men exert their utmost skills to save the life of everyone to the last moment. There is reason to believe that vaccination has preserved thousands, who from a weak constitution would formerly have succumbed to smallpox. Thus the weak members of civilised societies propagate their kind. No one who has attended to the breeding of domestic animals will doubt that this must be highly injurious to the race of man. It is surprising how soon a want of care, or care wrongly directed, leads to the degeneration of a domestic race; but excepting in the case of man himself, hardly any one is so ignorant as to allow his worst animals to breed (1970, p. 501).

In Darwin's day (and even in the early parts of this century), some applied this view to the human race via the concept of eugenics. By January 22, 1973, the United States Supreme Court, in a 7-to-2 vote, decided that the human embryo growing within the human womb no longer is "human." Rather, it is a "thing" that may be ripped out, slaughtered, and tossed into the nearest garbage dump. And the lengths to which some will go in order to justify such a position defy description. As an example, consider the position of the late atheist Carl Sagan and his wife, Ann Druyan. In an article on "The Question of Abortion" that they co-authored for *Parade* magazine, these two humanists contended for the ethical permissibility of human abortion on the grounds that the fetus, growing within a woman's body for several months following conception, is not a human being. Their conclusion, therefore, was this: the killing of this tiny creature is not murder.

And what was the basis for this assertion? Sagan and Druyan argued their case by subtly employing the concept known as "embryonic recapitulation," which suggests that as the human embryo develops, it repeats its evolutionary history, going through ancestral stages such as an amoeba-like blob, a fish, an amphibian, a reptile, etc. So, watching the human embryo grow is like watching a "silent moving picture" of evolution. They stated that the embryo first is "a kind of parasite" that eventually looks like a "segmented worm." Further alterations, they wrote, reveal "gill arches" like that of a "fish or amphibian." Supposedly, "reptilian" features emerge, and later give rise to "mammalian...pig-like" traits. By the end of two months, according to these two authors, the creature resembles a "primate but is still not quite human" (1990, p. 6).

The concept of embryonic recapitulation, which first was set forth in the mid-1860s by German scientist Ernst Haeckel, long since has been discredited and shown to be without any

basis in scientific fact (see Simpson, et al., 1957, p. 352). But so desperate were Sagan and Druyan to find something–anything–in science to justify their belief that abortion is not murder, they resurrected the ancient concept, dusted it off, and attempted to give it some credibility as an appropriate reason why abortion is not murder. Surely this demonstrates the lengths to which evolutionists will go to substantiate their theory, as well as the inordinate practices that the theory generates when followed to its logical ends.

According to Darwin, "weaker" members of society are unfit and, by the laws of nature, normally would not survive. Who is weaker than a tiny baby growing in the womb? The baby cannot defend himself, cannot feed himself, and cannot even speak for himself. He (or she) is completely and totally dependent upon the mother for life. Since nature "selects against" the weaker animal, and since man is an animal, why should man expect any deferential treatment?

Once those who are helpless, weak, and young become expendable, who will be next? Will it be the helpless, weak, and old? Will it be those whose infirmities make them "unfit" to survive in a society that values the beautiful and the strong? Will it be those who are lame, blind, maimed? Will it be those whose IQ falls below a certain point or whose skin is a different color? Some in our society already are calling for such "cleansing" processes to be made legal, using euphemisms such as "euthanasia" or "mercy killing." After all, they shoot horses, don't they?

MORALS, ETHICS, AND THE EXISTENCE OF GOD

When George Gaylord Simpson commented that "morals arise only in man" (1967, p. 346), he acknowledged (whether or not he intended to) the fact that morality is something unique to humankind. No two apes ever sat down and said, "Hey, I

have a good idea. Today let's talk about morals and ethics." On the same page of his book, Simpson thus was forced to admit that "the workings of the universe cannot provide any automatic, universal, eternal, or absolute ethical criteria of right and wrong" (p. 346). In their book, *Why Believe? God Exists!*, Miethe and Habermas observed:

> At every turn in the discussion of moral values, the naturalistic position is weighted down with difficulties. It has the appearance of a drowning swimmer trying to keep its head above water. If it concedes something on the one hand, it is condemned on the other. But if it fails to admit the point, it appears to be in even more trouble. It is an understatement to say, at the very least, that naturalism is not even close to being the **best** explanation for the existence of our moral conscience (1993, p. 219, emp. in orig.).

What, then, is the "best explanation for the existence of our moral conscience"? John Henry Newman assessed the situation like this:

> Inanimate things cannot stir our affections; these are correlative with persons. If, as is the case, we feel responsibility, are ashamed, are frightened, at transgressing the voice of conscience, this implies that there is One to whom we are responsible, before whom we are ashamed, whose claims upon us we fear...we are not affectionate towards a stone, nor do we feel shame before a horse or a dog; we have no remorse or compunction on breaking mere human law...and thus the phenomenon of Conscience, as a dictate, avails to impress the imagination with the picture of a Supreme Governor, a Judge, holy, just, powerful, all-seeing, retributive (1887, pp. 105,106).

Theistic philosopher David Lipe wrote:

> In conflicts of moral judgments, some judgments are recognized as better than others.... If it is not the case that one moral judgment is any better than any other

> moral judgment, then it is nonsensical to prefer one over the other. However, every person finds himself preferring one judgment over another, and in this admission (that one is better than the other), it is claimed that one is responding to a law which, in effect, measures the judgments…. I am convinced that all men have the moral experience of feeling "obligated" in a certain way, and that this sense of "moral obligation" is connected with God. This idea is consistent with the meaning of religion itself. The word "religion" is a compound of the Latin *re* and *ligare*, meaning "to bind back." Thus, for the religionist, there is a bond existing between man and God. This bond is the feeling of being morally obligated to live up to a specific moral law or standard which is the expression of the commands of God and which presses down on everyone (1987b, 7:40,37).

In the long run, morality simply cannot survive if its ties to religion are cut. W.T. Stace, who was neither a theist nor a friend of religion, nevertheless agreed wholeheartedly with such an assessment when he wrote:

> The Catholic bishops of America once issued a statement in which they said that the chaotic and bewildered state of the modern world is due to man's loss of faith, his abandonment of God and religion. **I agree** with this statement.... Along with the ruin of the religious vision there went the ruin of moral principles and indeed of all values (1967, pp. 3,9, emp. in orig.).

This "ruin of moral principles" is what Glenn C. Graber referred to in his doctoral dissertation on "The Relationship of Morality and Religion" as the "cut-flowers thesis"–a concept that explains what happens to morals and ethics when they are divorced from their religious moorings based on the existence of the "Supreme Governor"–God (1972, pp. 1-5). Perhaps Leo Tolstoy provided an early statement of this thesis when he suggested:

> The attempts to found a morality apart from religion are like the attempts of children who, wishing to transplant a flower that pleases them, pluck it from the roots that seem to them unpleasing and superfluous, and stick it rootless into the ground. Without religion there can be no real, sincere morality, just as without roots there can be no real flower (1964, pp. 31,32).

In discussing the cut-flowers thesis, Lipe remarked:

> Tolstoy's conclusion is a matter of grave importance to those who take religion seriously. Thus, on the cut-flowers thesis, those who believe morality is a valuable human institution, and those who wish to avoid moral disaster, will make every effort to preserve its connection with religion and the religious belief which forms its roots. The apologetic force of the cut-flowers thesis becomes even stronger if the religionist makes the additional claim that morality **is presently** in a withering stage. This claim takes on a sense of **urgency** when the decline in morality is identified with the muddle in which civilization now finds itself (1987a, 7:27, emp. in orig.).

And civilization is indeed in a "muddle" identified by a definite "decline in morality." With guns blasting, children (some as young as 10 or 11 years old) bearing a grudge or desiring to settle a score, walk into school hallways, classrooms, and libraries, shoot until they have emptied every round from all chambers, and watch gleefully as shell casings, teachers, and classmates alike fall silently at their feet. Then parents, administrators, and friends congregate amidst the bloody aftermath and wonder what went wrong. Yet why are we shocked or enraged by such conduct? Our children have been taught they are nothing more than "naked apes"–and they are intelligent enough to figure out exactly what that means. As Guy N. Woods lamented, "Convince a man that he came from a monkey, and he'll act like one!" (1976, 118[33]:514). Children have

been taught that religion is an outward sign of inner weakness–a crutch used by people too weak and cowardly to "pull themselves up by their own boot straps." Why, then, should we be at all surprised when they react accordingly (even violently!)? After all, "nature," said Lord Tennyson, "is red in tooth and claw."

The truth of the matter is that only the theocentric approach to this problem is consistent logically and internally; only the theocentric approach can provide an objective, absolute set of morals and ethics. But why is this the case?

True morality is based on the fact of the unchanging nature of Almighty God. He is eternal (Psalm 90:2; 1 Timothy 1:17), holy (Isaiah 6:3; Revelation 4:8), just and righteous (Psalm 89:14), and forever consistent (Malachi 3:6). In the ultimate sense, only He is good (Mark 10:18). Furthermore, since He is perfect (Matthew 5:48), the morality that issues from such a God is good, unchanging, just, and consistent–i.e., exactly the opposite of the relativistic, deterministic, or situational ethics of the world.

When Newman suggested in the above quotation that we as humans "feel responsibility," it was a recognition on his part that there is indeed within each man, woman, and child a sense of moral responsibility which derives from the fact that God is our Creator (Psalm 100:3) and that we have been fashioned in His spiritual image (Genesis 1:26-27). As the potter has the sovereign right over the clay with which he works (Romans 9:21), so our Maker has the sovereign right over His creation since in His hand "is the soul of every living thing" (Job 12:10). As the patriarch Job learned much too late, God is not a man with whom one can argue (Job 9:32).

Whatever God does and approves is good (Psalm 119:39, 68; cf. Genesis 18:25). What He has commanded results from the essence of His being–Who He is–and therefore also is good. In the Old Testament, the prophet Micah declared of

God: "He showed thee, O man, what is good; and what doth Jehovah require of thee, but to do justly, and to love kindness, and walk humbly with thy God" (Micah 6:8). In the New Testament, the apostle Peter admonished: "As he who called you is holy, be ye yourselves also holy in all manner of living; because it is written, 'Ye shall be holy: for I am holy' " (1 Peter 1:15).

The basic thrust of God-based ethics concerns the relationship of man to the One Who created and sustains him. God Himself is the unchanging standard of moral law. His perfectly holy nature is the ground or basis upon which "right" and "wrong," "good" and "evil" are determined. The Divine will–expressive of the very nature of God–constitutes the ultimate ground of moral obligation. Why are we to pursue holiness? Because God is holy (Leviticus 19:2; 1 Peter 1:16). Why are we not to lie, cheat, or steal (Colossians 3:9)? Because God's nature is such that He cannot lie (Titus 1:2; Hebrews 6:18). Since God's nature is unchanging, it follows that moral law, which reflects the divine nature, is equally immutable.

While there have been times in human history when each man "did that which was right in his own eyes" (Judges 17:6), that never was God's plan. He has not left us to our own devices to determine what is right and wrong because He knew that through sin, man's heart would become "exceedingly corrupt" (Jeremiah 17:9). Therefore, God "has spoken" (Hebrews 1:1), and in so doing He has made known to man His laws and precepts through the revelation He has provided in written form within the Bible (1 Corinthians 2:11ff.; 2 Timothy 3:16-17; 2 Peter 1:20-21). Thus, mankind is expected to act in a morally responsible manner (Matthew 19:9; Acts 14:15-16; 17:30; Hebrews 10:28ff.) in accordance with biblical laws and precepts. In addressing this point, Wayne Jackson remarked that the Bible "contains many rich **principles** which challenge us to develop a greater sense of spiritual maturity and to soar to heights that are God-honoring.... Our Creator has placed us

'on our honor' to grow to greater heights.... [Biblical] morality runs deep into the soul; it challenges us to get our hearts under control" (1984, 4:23, emp. in orig.). Herbert Lockyer discussed this concept in vividly expressive terms when he wrote:

> Being made righteous before God, it is imperative for us to live righteously before men. God, however, has not only a standard for us, He intends Christians **to be standards** (I Timothy 4:12; James 1:22). Think of these manifold requirements. We are told to be different from the world (II Corinthians 5:17; Romans 6:4; 12:1,2). We are to shine as lights amidst the world's darkness (Matthew 5:14-16). We are to walk worthy of God, as His ambassadors (II Corinthians 5:20; Ephesians 5:8). We are to live pleasing to God (I Thessalonians 4:1; II Thessalonians 1:11-2:17; Colossians 1:10). We are to be examples to others in all things (I Corinthians 4:13; I Timothy 4:12). We are to be victorious in temptation and tribulation (Romans 12:12; Colossians 1:11, James 1:2-4). We are to be conspicuous for our humility (Ephesians 4:12; Colossians 3:13; I Peter 3:3,4). We must appropriate divine power for the accomplishment of all God wants to make us, and desires us to be (Philippians 3:13; 3:21; II Peter 1:3)....
>
> Throughout all of the **epistles** are scattered rules and directions, covering the whole ground of private and social life. The apostles taught that as a man **believes**, so must he **behave**. Creed should be reflected in conduct. **Virtues** must be acquired (Galatians 5:22,23; Colossians 3:12-17; II Peter 1:5-7; Titus 2:12), and **vices** shunned (Galatians 5:19,20,21; Colossians 3:5-9). Love, as the parent of all virtue must be fostered (Romans 5:1,2,7,8; I Corinthians 13; II Corinthians 5:19; Hebrews 11). Christ's image must be reflected in the lives of those He saves (Romans 8:37-39; I Corinthians 15:49-58; II Corinthians 5:8; Philippians 3:8-14).

> Truly, ours is a high and holy calling. Belonging to Christ, we must behave accordingly. Having accepted Christ we must **live** Christ, which is not a mere fleshly imitation of Him but the outworking of His own life within. If His law is written upon our heart (Hebrews 8:10), and His Spirit enlightens our conscience (John 16:13); then, with a will harmonized to the Lord's will (Psalm 143:10), and affections set on heavenly things (Colossians 3:1), there will be no contradiction between profession and practice. What we believe will influence behavior, and creed will harmonize with conduct and character (1964, pp. 221-223, emp. in orig.).

Lockyer's last point is one that I have tried to make over and over within this discussion: "What we believe will influence behavior, and creed will harmonize with conduct and character." If a man believes he came from an animal, if he is consistent with his belief his conduct will match accordingly. If a man believes he has been "created in the image and likeness of God," and if he is consistent with his belief, then his conduct will match accordingly.

David Lipe, speaking as both a philosopher and a theist, has suggested that for quite some time, certain philosophers and theologians generally have "turned away from" standard textbook arguments for the existence of God, not because the doctrines were weak or had been disproved, but because "morality has furnished the main support" (1987a, 7:26). Indeed it has.

Miethe and Habermas were correct when they suggested that "naturalism is not even close to being the best explanation for the existence of our moral conscience" (1993, p. 219). Man's moral and ethical nature, as Newman proclaimed, "implies that there is One to whom we are responsible...a Supreme Governor, a Judge, holy, just, powerful" (1887, pp. 105, 106).

Eventually, each of us will meet "the righteous judgment of God, who will render to every man according to his works" (Romans 2:5-6). It therefore behooves us to "live soberly, righteously, and godly in this present age" (Titus 2:12) for, as Carnell put it:

> Death is the one sure arch under which all men must pass. But if death ends all–and it very well may unless we have inerrant revelation to assure us to the contrary–what virtue is there in present striving? Job...expressed [that] man lives as if there is a sense to life, but in the end, his mortal remains provide but a banquet for the worms, for man dies and "The worm shall feed sweetly on him" (Job 24:20).... The only full relief man can find from the clutches of these "tiny cannibals" is to locate some point of reference outside of the flux of time and space which can serve as an elevated place of rest. In Christianity, and in it alone, we find the necessary help, the help of the Almighty, He who rules eternity (1948, pp. 332,333).

5

CONCLUSION

Theists happily affirm it; skeptics begrudgingly concede it. It is simple logic. **Everything designed has a designer**. Design, at least in part, has to do with the arrangement of individual components within an object so as to accomplish a functional or artistic purpose. An automobile contains design because its many units, engineered and fitted together, result in a machine that facilitates transportation. A beautiful portrait evinces design when paints of various colors are combined, by brush or knife upon canvas, so as to effect an aesthetic response. Rational individuals instinctively recognize the presence of design–for which there are multiplied thousands of examples within the Universe that we inhabit.

Adding to the force of this argument is the principle known as *a fortiori* reasoning. If something is said to follow in an *a fortiori* fashion, it means that the conclusion can be reached with an even greater logical necessity than another conclusion already accepted. Here is an example.

Both a pair of pliers and a computer are tools. If one admits that it took a designer to make the pliers (a conclusion that no rational person would deny), it follows with even greater force that it must have required a designer to make the computer, since the computer is much more complicated than the pliers. Using *a fortiori* reasoning, it can be established that if the lesser (the pliers) requires a designer, the greater (the computer) **absolutely demands** a designer. Again, this is simple logic.

In making the case for the existence of God, the Grand Designer, I have examined numerous examples of His handiwork throughout the Universe. The design inherent in the Universe itself, and in the living things that it contains, cannot be ignored or explained away. The Universe, plants, animals, and man were not conceived accidentally by "Father Chance," and then birthed by "Mother Nature."

Yet some would have us believe that is exactly what happened–and they will go to almost any length to avoid the implications of the design in nature that demands a Designer. Why? Atheist Paul Ricci has answered: "...either a divine being exists or he does not; there are no third possibilities regardless of what the skeptic or agnostic says" (1986, p. 140). The tragic fact is that some people are determined not to believe in God, regardless of how powerful, or how overwhelming, the evidence may be.

Paul reminded the Christians in Rome of those who, "knowing God, glorified him not as God, neither gave thanks; but became vain in their reasonings, and their senseless heart was darkened. And even as they refused to have God in their knowledge, God gave them up unto a reprobate mind" (Romans 1: 21,28). The problem about which the apostle wrote was not a failure to accept something that was **unknowable** (the text in Romans clearly indicates that these were people who could, and did, know of the existence of God). Rather, it was a problem of refusing to accept what was **knowable**–i.e., God's reality. Those to whom Paul referred had such a built-in prejudice against God that they abjectly **refused** to have God in their knowledge. This situation, then, caused the apostle to write (by inspiration of the Holy Spirit) that "professing themselves to be wise, they became fools" (Romans 1:22).

In biblical usage, the term "fool" generally does not indicate a person of diminished intelligence, and it certainly is not used here in such a fashion. Instead, the term carries both a moral and religious judgment. As Bertram has noted:

> With reference to men the use is predominantly psychological. The word implies censure on man himself: his acts, thoughts, counsels, and words are not as they should be. The weakness may be due to a specific failure in judgment or decision, but a general deficiency of intellectual and spiritual capacities may also be asserted (1971, 4:832).

This is why the psalmist (again, writing by inspiration) said that "the fool hath said in his heart, there is no God" (14:1). Strong words, those. Yet they were not intended to offend. Rather, they were intended as a commentary on the fact that, indeed, one would have to be foolish to observe the evidence that establishes beyond reasonable doubt the existence of God—and then turn and deny both the evidence and the God documented by the evidence. The Scriptures make it plain that at no time in all of recorded history has God left Himself without a witness of Himself in nature (Acts 14:17). No one will stand before the judgment bar of God in the great day yet to come, shrug their shoulders with indifference, and nonchalantly say with impunity, "I'm sorry I didn't believe in you, but there just wasn't enough evidence to prove you existed." The evidence that establishes the case for the existence of God is simply too plentiful, and too powerful.

REFERENCES

Allan, John (1989), *The Human Difference* (Oxford, England: Lion).

Anderson, Bruce L. (1980), *Let Us Make Man* (Plainfield, NJ: Logos International).

Andrews, E.H. (1978), *From Nothing to Nature* (Welwyn, Hertfordshire, England: Evangelical Press).

Asimov, Isaac (1970), "In the Game of Energy and Thermodynamics You Can't Even Break Even," *Smithsonian Institute Journal*, pp. 4-10, June.

Asimov, Isaac (1975), *Guide to Science* (London: Pelican Books).

Augros, Robert and George Stanciu (1987), *The New Biology* (Boston, MA: New Science Library).

Avraham, Regina (1989), *The Circulatory System* (New York: Chelsea House).

Baldi, Pierre (2001), *The Shattered Self: The End of Natural Evolution* (Cambridge, MA: MIT Press).

Ball, Philip (2002), "Is Physics Watching Over Us?," *Nature*, [Online], URL: www.nature.com/nsu/020812/020812-2.html, August.

Barnett, Lincoln (1959), *The Universe and Dr. Einstein* (New York: Mentor).

Barrow, John D. (1991), *Theories of Everything* (Oxford, England: Clarendon Press).

Barrow, John D. (2000), *The Book of Nothing: Vacuums, Voids, and the Latest Ideas about the Origins of the Universe* (New York: Pantheon).

Barrow, John D. and Frank Tipler (1986), *The Anthropic Cosmological Principle* (Oxford, England: Oxford University Press).

Bartelmez, George W. (1926), "Human Structure and Development," *The Nature and the World of Man*, ed. H.H. Newman (Garden City, NY: Garden City Publishing), pp. 440-470.

Bass, Thomas (1990), "Interview with Richard Dawkins," *Omni*, 12[4]:58-60,84,86-89, January.

Beck, William (1971), *Human Design* (New York: Harcourt, Brace, Jovanovich).

Behe, Michael J. (1998), "Intelligent Design Theory as a Tool for Analyzing Biochemical Systems," *Mere Creation*, ed. William A. Dembski (Downers Grove, IL: InterVarsity Press).

Berlinski, David (1998), "Was There a Big Bang?," *Commentary*, pp. 28-38, February.

Bertram, George (1971), "*moros*," *Theological Dictionary of the New Testament*, ed. Gerhard Kittel and Gerhard Friedrich (Grand Rapids, MI: Eerdmans).

"Big Bang Brouhaha" (1992), *Nature,* 356:731, April 30.

Blanchard, John (2000), *Does God Believe in Atheists?* (Auburn, MA: Evangelical Press).

Block, Irvin (1980), "The Worlds Within You," *Science Digest,* special edition, pp. 49-53,118, September/October.

Borek, Ernest (1973), *The Sculpture of Life* (New York: Columbia University Press).

Boslough, J. (1985), *Stephen Hawking's Universe* (New York: William Morrow).

Brand, Paul and Phillip Yancey (1980), *Fearfully and Wonderfully Made* (Grand Rapids, MI: Zondervan).

Burnett, Allison L. (1961), *Natural History,* November.

Cahill, George F. (1981), *Science Digest,* 89[3]:105, April.

Cairns-Smith, A.G. (1985), *Seven Clues to the Origin of Life* (Cambridge, England: Cambridge University Press).

Cardoso, Silvia H. (1997-1998), "What is Mind?," *Brain & Mind*, [On-line], URL: http://www.epub.org.br/cm/n04/editori4_i.htm, No. 4, December (1997)-February (1998).

Carnell, Edward John (1948), *An Introduction to Christian Apologetics* (Grand Rapids, MI: Eerdmans).

Cauwels, Janice (1986), *The Body Shop* (St. Louis, MO: C.V. Mosby).

Chaisson, E.J. (1992), "Early Results from the Hubble Space Telescope," *Scientific American,* 266[6]:44-51, June.

Cherfas, Jeremy (1984), *New Scientist,* 101:14-16, May 17.

Clarke, William N. (1912), *An Outline of Christian Theology* (New York: Charles Scribner's Sons).

Cosgrove, Mark P. (1987), *The Amazing Body Human* (Grand Rapids, MI: Baker).

Cousins, Norman (1985), "Commentary," in *Nobel Prize Conversations* (Dallas, TX: Saybrook). [This book is a record of conversations that occurred in November, 1982 at the Isthmus Institute in Dallas, Texas, among four Nobel laureates: Sir John Eccles, Ilya Prigogine, Roger Sperry, and Brian Josephson.]

Cramer, John G. (1999), "Before the Big Bang," *Analog Science Fiction & Fact Magazine,* [On-line], URL: http://www.npl.washington. edu/AV/altvw94.html, March.

Crick, Francis (1981), *Life Itself: Its Origin and Nature* (New York: Simon and Schuster).

Daley, Janet (1996), "Interview" in *Daily Telegraph* (London), May 1.

Darrow, Clarence (1988 reprint), "An Address Delivered to the Prisoners in the Chicago County Jail," *Philosophy and Contemporary Issues,* ed. John R. Burr and Milton Goldinger (New York: Macmillan), pp. 58-66.

Darwin, Charles (1859), *The Origin of Species* (London: A.L. Burt).

Darwin, Charles (1970 reprint), *The Descent of Man* (New York: Modern Library). This is a two-volume edition in a single binding that also includes *The Origin of Species.*

Darwin, Francis (1889), *Life and Letters of Charles Darwin* (London: Appleton).

Davies, Paul (1984), *Superforce: The Search for a Grand Unified Theory of Nature* (New York: Simon & Schuster).

Davies, Paul (1988), *The Cosmic Blueprint: New Discoveries in Nature's Creative Ability to Order the Universe* (New York: Simon & Schuster).

Davies, Paul (1992a), *The Mind of God* (New York: Simon & Schuster).

Davies, Paul (1992b), "The Mind of God," *Omni,* 14[5]:4, February.

Davis, George (1958), "Scientific Revelations Point to a God," *The Evidence of God in an Expanding Universe,* ed. John C. Monsma (New York: G.P. Putnam's Sons).

Dawkins, Richard (1982), "The Necessity of Darwinism," *New Scientist,* 94:130-132, April 15.

Dawkins, Richard (1986), *The Blind Watchmaker* (New York: W.W. Norton).

Dawkins, Richard (1989), *The Selfish Gene* (Oxford, England: Oxford University Press), second edition.

DeBakey, Michael E. (1984), in *World Book Encyclopedia* (Chicago, IL: World Book/Childcraft International).

Denton, Michael (1998), *Nature's Destiny: How the Laws of Biology Reveal Purpose in the Universe* (New York: Simon & Schuster).

Dyson, Lisa, Matthew Kleban, and Leonard Susskind (2002), "Disturbing Implications of a Cosmological Constant," *Journal of High Energy Physics,* 10:011-037, November 12. [Also available on-line at: http://xxx.lanl.gov/abs/hep-th/0208013.]

Eccles, John C. (1958), *Scientific American,* September.

Eccles, John C. (1973), *The Understanding of the Brain* (New York: McGraw-Hill).

Eccles, John C. (1984), "Modern Biology and the Turn to Belief in God," *The Intellectuals Speak Out About God,* ed. Roy A. Varghese (Chicago, IL: Regnery), pp. 47-50.

Eccles, John C. (1992), *The Human Psyche* (London: Routledge).

Eccles, John C. and Daniel N. Robinson (1984), *The Wonder of Being Human: Our Brain and Our Mind* (New York: The Free Press).

Encyclopaedia Britannica (1989), "Bionics," (Chicago: Encyclopaedia Britannica, Inc.).

Estling, Ralph (1994), "The Scalp-Tinglin', Mind-Blowin', Eye-Poppin', Heart-Wrenchin', Stomach-Churnin', Foot-Stumpin', Great Big Doodley Science Show!!!," *Skeptical Inquirer*, 18[4]:428-430, summer.

Estling, Ralph (1995), "Letter to the Editor," *Skeptical Inquirer*, 19[1]:69-70, January/February.

"Evidence for the Fine-Tuning of the Universe," (no date), [Online], URL: http://www.godandscience.org/apologetics/designun.html.

Ferguson, Kitty (1994), *The Fire in the Equations: Science, Religion, and the Search for God* (Grand Rapids, MI: Eerdmans).

Fletcher, Joseph (1966), *Situation Ethics: The New Morality* (Philadelphia, PA: Westminster).

Fox, Karen (2002), *The Big Bang Theory—What It Is, Where It Came from, and Why It Works* (New York: John Wiley & Sons).

Frair, Wayne A. and Percival Davis (1983), *A Case for Creation* (Chicago, IL: Moody).

Fukuyama, Francis (2002), *Our Posthuman Future* (New York: Farrar, Straus and Giroux).

Futuyma, Douglas (1983), *Science on Trial* (New York: Pantheon).

Gardner, Martin (1988), *The New Age: Notes of a Fringe Watcher* (Buffalo, NY: Prometheus).

Gardner, Lynn (1994), *Christianity Stands True* (Joplin, MO: College Press).

Gardner, Martin (2000), *Did Adam and Eve Have Navels?* (New York: W.W. Norton).

Geisler, Norman L. (1976), *Christian Apologetics* (Grand Rapids, MI: Baker).

Geisler, Norman L. (1981), *Options in Contemporary Christian Ethics* (Grand Rapids, MI: Baker).

Geisler, Norman (1984), "The Collapse of Modern Atheism," *The Intellectuals Speak Out About God,* ed. Roy A. Varghese (Chicago, IL: Regnery), pp. 129-152.

Geisler, Norman L. and Winfried Corduan (1988), *Philosophy of Religion* (Grand Rapids, MI: Baker).

Giant Panda Zoobook (no date), (San Diego, CA: San Diego Zoo).

Gillen, Alan L. (2001), *Body by Design* (Green Forest, AR: Master Books).

Gitt, Werner (1997), *In the Beginning Was Information* (Bielefeld, Germany: Christliche Literatur-Verbreitung).

Gitt, Werner (1999), *The Wonder of Man* (Bielefeld, Germany: Christliche Literatur-Verbreitung E.V.).

Gliedman, John (1982), "Scientists in Search of the Soul," *Science Digest,* 90[7]:77-79,105, July.

Gore, Rick (1983), "The Once and Future Universe," *National Geographic* 163[6]:704-748, June.

Gould, Stephen Jay (1980), *The Panda's Thumb* (New York: W.W. Norton).

Graber, Glenn C. (1972), *The Relationship of Morality and Religion: Language, Logic, and Apologetics* (Ann Arbor, MI: University of Michigan), doctoral dissertation.

Gribbin, John (1976), "Oscillating Universe Bounces Back," *Nature,* 259:15-16.

Gribbin, John (1981), *Genesis: The Origins of Man and the Universe* (New York: Delacorte).

Gribbin, John (1983), "Earth's Lucky Break," *Science Digest,* 91[5]:36-37,40,102, May.

Gribbin, John (1986), "Cosmologists Move Beyond the Big Bang," *New Scientist,* 110[1511]:30.

Guinness, Alma E., ed. (1987), *ABC's of the Human Body* (Pleasantville, NY: Reader's Digest Association).

Guth, Alan (1981), "Inflationary Universe: A Possible Solution to the Horizon and Flatness Problems," *Physical Review D*, 23:347-356.

Guth, Alan (1988), Interview in *Omni,* 11[2]:75-76,78-79,94, 96-99, November.

Guth, Alan and Paul Steinhardt (1984), "The Inflationary Universe," *Scientific American,* 250:116-128, May.

Haeckel, Ernst (1905), *The Wonders of Life*, trans. J. McCabe (London: Watts).

Haskins, Caryl P. (1971), "Advances and Challenges in Science in 1970," *American Scientist*, 59:298-307, May/June.

Hawking, Stephen W. (1988), *A Brief History of Time* (New York: Bantam).

Heeren, Fred (1995), *Show Me God* (Wheeling, IL: Searchlight Publications).

Hitching, Francis (1982), *The Neck of the Giraffe* (New York: Ticknor and Fields).

Hoyle, Fred (1955), *Frontiers of Astronomy* (London, Heinemann).

Hoyle, Fred (1959), *Religion and the Scientists*, as quoted in Barrow, John and Frank Tipler, *The Anthropic Cosmological Principle* (Oxford, England: Oxford University Press), p. 22.

Hoyle, Fred (1981), "The Big Bang in Astronomy," *New Scientist,* 92:521-527, November 19.

Hoyle, Fred (1982), "The Universe: Past and Present Reflections," *Annual Review of Astronomy and Astrophysics,* 20:16.

Hoyle, Fred and Chandra Wickramasinghe (1981), *Evolution from Space* (London: J.M. Dent & Sons).

Hoyle, Fred, Geoffrey Burbidge, and Jayant V. Narlikar (2000), *A Different Approach to Cosmology* (Cambridge, England: Cambridge University Press).

Hull, David (1974), *Philosophy of Biological Science* (Englewood Cliffs, NJ: Prentice-Hall).

Hunt, Dave (1996), *In Defense of the Faith* (Eugene, OR: Harvest House).

Huxley, Aldous (1966), "Confessions of a Professed Atheist," *Report: Perspective on the News*, 3:19, June.

Humanist Manifestos I and II (1973/1977), (Buffalo, NY: Prometheus).

"The Inflationary Universe" (2001), [On-line], URL: http://astsun.astro.virginia.edu/~jh8h/Foundations/chapter15.html.

Jackson, Wayne (1974), *Fortify Your Faith (in an Age of Doubt)* (Stockton, CA: Courier Publications).

Jackson, Wayne (1984), "Rules by Which Men Live," *Reason & Revelation*, 4:21-224, May.

Jackson, Wayne (1993), *The Human Body: Accident or Design?* (Stockton, CA: Courier Publications).

Jackson, Wayne (1995), "The Case for the Existence of God–Part III," *Reason & Revelation*, 15:49-55, July.

Jastrow, Robert (1977), *Until the Sun Dies* (New York: W.W. Norton).

Jastrow, Robert (1978), *God and the Astronomers* (New York: W.W. Norton).

Jastrow, Robert (1981), *The Enchanted Loom: Mind in the Universe* (New York: Simon and Schuster).

Jastrow, Robert (1982), "A Scientist Caught Between Two Faiths," Interview with Bill Durbin, *Christianity Today*, August 6.

Jeans, James (1929), *The Universe Around Us* (New York: MacMillan.

Johanson, Donald C. and Blake Edgar (1996), *From Lucy to Language* (New York: Nevraumont).

Jones, Steve (1996), *In the Blood: God, Genes, and Destiny* (London: HarperCollins).

Kandel, Eric R. (1991), "Nerve Cells and Behavior," *Principles of Neural Science,* ed. Eric R. Kandel, James H. Schwartz, and Thomas M. Jessell (New York: Elsevier), third edition.

Kautz, Darrel (1988), *The Origin of Living Things* (Milwaukee, WI: Privately published by the author).

Kenny, Anthony (1980), *The Five Ways: St. Thomas Aquinas' Proofs of God's Existence* (South Bend, IN: University of Notre Dame Press).

Koch, Christof (1997), "Computation and the Single Neuron," *Nature,* 385:207-210, January 16.

Kolb, Rocky (1998), "Planting Primordial Seeds," *Astronomy*, 26[2]:38-43, February.

Lawton, April (1981), "From Here to Infinity," *Science Digest,* 89[1]:98-105, January/February.

Leakey, Richard and Roger Lewin (1977), *Origins.* (New York: E. P. Dutton).

Lemonick, Michael D. (2001), "The End," *Time,* 157[25]:48-56, June 25.

Lemonick, Michael D. (2003a), "The Power of Mood," *Time,* 161[3]:64-69, January 20.

Lemonick, Michael D. (2003b), "Your Mind, Your Body," *Time,* 161[3]:63, January 20.

Lenihan, John (1974), *Human Engineering* (New York: John Braziller).

Lester, Lane P. and James C. Hefley (1998), *Human Cloning* (Grand Rapids, MI: Revell).

Lester, Lane P. and Raymond Bohlin (1984), *The Natural Limits of Biological Change* (Grand Rapids, MI: Zondervan).

Lewin, Roger (1992), *Complexity: Life at the Edge of Chaos* (New York: Macmillan).

Lewis, C.S. (1952), *Mere Christianity* (New York: MacMillan).

Lewontin, Richard (1978), "Adaptation," *Scientific American,* 239[3]:212-218,220,222,228,230, September.

Lewontin, Richard (2000), *It Ain't Necessarily So: The Dream of the Human Genome and Other Illusions* (New York: New York Review of Books).

Linde, Andrei (1994), "The Self-Reproducing Inflationary Universe," *Scientific American,* 271[5]:48-55, November.

Lipe, David L. (1987a), "The Foundations of Morality," *Reason and Revelation,* 7:27, July.

Lipe, David L. (1987b), "Religious Ethics and Moral Obligation," *Reason and Revelation,* 7:40,37, October.

Lipson, H.S. (1980), "A Physicist Looks at Evolution," *Physics Bulletin,* 31:138, May.

Livio, Mario (2000), *The Accelerating Universe* (New York: John Wiley).

Lockyer, Herbert (1964), *All the Doctrines of the Bible* (Grand Rapids, MI: Zondervan).

Macalister, Alexander (1886), "Man Physiologically Considered," *Living Papers*, (Cincinnati, OH: Cranston and Stowe), Vol. VII.

Macer, Darryl R.J. (1990), *Shaping Genes: Ethics, Law and Science of Using New Genetic Technology in Medicine and Agriculture* [On-line], (Eubios Ethics Institute), URL http://www.biol.tsukuba.ac.jp/macer/SG.html.

Mader, Sylvia S. (1979), *Inquiry Into Life* (Dubuque, IA: W.C. Brown).

Margenau, Henry and Abraham Varghese, eds. (1992), *Cosmos, Bios, and Theos* (La Salle, IL: Open Court Publishers).

Margulis, Lynn and Dorion Sagan (1995), *What is Life?* (Berkeley, CA: University of California Press).

Marlin, George J., Richard P. Rabatin, and John L. Swan, eds. (1986), *The Quotable Chesterton: A Topical Compilation of the Wit, Wisdom, and Satire of G.K. Chesterton* (San Francisco, CA: Ignatius Press).

Martin, Roy C. Jr. (1999), *Astronomy on Trial* (Lanham, MD: University Press of America).

Mayberry, Thomas C. (1970), "God and Moral Authority," *The Monist*, January.

Meiklejohn, J.M.D., trans. (1878), *Immanuel Kant, Critique of Pure Reason* (London).

Meyer, Stephen C. (1998), "The Explanatory Power of Design: DNA and the Origin of Information," *Mere Creation*, ed. William A. Dembski (Downers Grove, IL: InterVarsity Press).

Miethe, Terry L. and Gary R. Habermas (1993), *Why Believe? God Exists!* (Joplin, MO: College Press).

Miller, Benjamin and Goode, Ruth (1960), *Man and His Body* (New York: Simon and Schuster).

Morris, Henry M. (1974), *Scientific Creationism* (San Diego, CA: Creation-Life Publishers).

Morris, Henry M. (1985), *Creation and the Modern Christian* (El Cajon, CA: Master Books).

Morrison, Philip and Phylis (2001), "The Big Bang: Wit or Wisdom?," *Scientific American,* 284[2]:93,95, February.

Motulsky, Arno S. (1974), "Brave New World?," *Science*, 185: 654. As quoted in Henry M. Morris (1974), *The Troubled Waters of Evolution* (San Diego, CA: Creation-Life Publishers), p. 34.

Murphy, Nancey and George F.R. Ellis (1996), *On the Moral Nature of the Universe* (Minneapolis, MN: Fortress).

Murray, I. MacKay (1969), *Human Anatomy Made Simple* (Garden City, NY: Doubleday).

Murray, Michael J. (1999), *Reason for the Hope Within* (Grand Rapids, MI: Eerdmans).

Newman, John Henry (1887), *An Essay in Aid of a Grammar of Assent* (London: Longmans, Green and Co.).

Nicholl, Desmond S.T. (1994), *An Introduction to Genetic Engineering* (Cambridge, England: Cambridge University Press).

Nielsen, Kai (1973), *Ethics Without God* (London: Pemberton).

Nourse, Alan E. (1964), *The Body* (New York: Time-Life).

Nuland, Sherwin B. (1997), *The Wisdom of the Body* (New York: Knopf).

O'Hear, Anthony (1997), *Beyond Evolution: Human Nature and* the *Limits of Evolutionary Explanation* (New York: Oxford University Press).

Ornstein, Robert (1991), *The Evolution of Consciousness* (New York: Prentice Hall Press).

Ornstein, Robert and Richard F. Thompson (1984), *The Amazing Brain* (Boston, MA: Houghton Mifflin).

Overbye, Dennis (2001), "Before the Big Bang, There Was… What?," *The New York Times* [On-line], URL: http:// www.nytimes.com/2001/05/22/science/22BANG.html.

Overman, Dean L. (1997), *A Case Against Accident and Self-Organization* (Lanham, MD: Rowman and Littlefield).

Perloff, James (1999), *Tornado in a Junkyard: The Relentless Myth of Darwinism* (Arlington, MA: Refuge Books).

Petit, Charles, (1998), "A Few Starry and Universal Truths," *U.S. News & World Report*, 24[2]:58, January 19.

Pfeiffer, John (1961), *The Human Brain* (New York: Harper and Brothers).

Pfeiffer, John (1964), *The Cell* (New York: Time, Inc.).

Pines, Maya (1986), in *The Incredible Machine* (Washington, D.C., National Geographic Society).

Pinker, Steven (1997), "Interview," *Sunday Telegraph* (London).

Popper, Karl R. (1972), *Objective Knowledge: An Evolutionary Approach* (Oxford, England: Oxford University Press).

Popper, Karl R. and John C. Eccles (1977), *The Self and Its Brain* (New York: Springer International).

Pratchett, Terry (1994), *Lords and Ladies* (New York: HarperPrism).

Preuss, Paul (2000), "MAXIMA Project's Imaging of Early Universe Agrees It Is Flat, But…," [On-line], URL: http://www.lbl.gov/Science-Articles/Archive/maxima-results.html.

Ricci, Paul (1986), *Fundamentals of Critical Thinking* (Lexington, MA: Ginn Press).

Ridley, Matt (1999), *Genome: Autobiography of a Species in 23 Chapters* (New York: HarperCollins).

Ross, Hugh (1991), *The Fingerprint of God* (Orange, CA: Promise Publishing), second edition.

Ross, Hugh (1993), *The Creator and the Cosmos* (Colorado Springs, CO: Navpress).

Ruse, Michael (1995), *Evolutionary Naturalism* (London: Routledge).

Russell, Bertrand (1969), *Autobiography* (New York: Simon & Schuster), Vol. III.

Sagan, Carl (1979), *Broca's Brain* (New York: Random House).

Sagan, Carl (1980), *Cosmos* (New York: Random House).

Sagan, Carl (1997), "Life," *Encyclopaedia Britannica* (New York: *Encyclopaedia Britannica*, Inc.), 22:964-981.

Sagan, Carl and Ann Druyan (1990), "The Question of Abortion," *Parade Magazine*, pp. 4-8, April 22.

Sarfati, Jonathan D. (1998), "If God Created the Universe, then Who Created God?," *Creation Ex Nihilo Technical Journal,* 12[1]:21.

Sartre, Jean Paul, (1961), "Existentialism and Humanism," *French Philosophers from Descartes to Sartre*, ed. Leonard M. Marsak (New York: Meridian).

Sartre, Jean Paul (1966), "Existentialism," reprinted in *A Casebook on Existentialism,* ed. William V. Spanos (New York: Thomas Y. Crowell).

Scadding, S.R. (1981), *Evolutionary Theory,* May.

Schaller, George B., Hu Jinchu, Pan Wenshi, and Zhu Jing (1985), *The Giant Pandas of Wolong* (Chicago, IL: University of Chicago Press).

Schiefelbein, Susan (1986), in *The Incredible Machine* (Washington, D.C.: National Geographic Society).

Science Digest (1981), 89[1]:124, January/February.

Sedeen, Margaret (1986), in *The Incredible Machine* (Washington, D.C.: National Geographic Society).

Shryock, Harold (1968), "Your Bones Are Alive!," *Signs of the Times,* January.

Silk, Joseph (1980), *The Big Bang* (San Francisco, CA: W.H. Freeman).

Simpson, George Gaylord (1949), *The Meaning of Life* (New Haven, CT: Yale University Press).

Simpson, George Gaylord (1967), *The Meaning of Evolution* (New Haven, CT: Yale University Press), revised edition.

Simpson, George Gaylord, C.S. Pittendrigh and L.H. Tiffany (1957), *Life: An Introduction to Biology* (New York: Harcourt, Brace & Company).

Smoot, George and Keay Davidson (1993), *Wrinkles in Time* (New York: Avon).

Sperry, Roger W. (1966), "Mind, Brain, and Humanist Values," *Bulletin of the Atomic Scientists,* September.

Spetner, Lee M. (1997), *Not By Chance* (Brooklyn, NY: Judaica Press).

Sproul, R.C. (1992), *Essential Truths of the Christian Faith* (Wheaton, IL: Tyndale House).

Sproul, R.C. (1994), *Not A Chance* (Grand Rapids, MI: Baker).

Sproul, R.C., John Gerstner, and Arthur Lindsley (1984), *Classical Apologetics* (Grand Rapids, MI: Zondervan).

Stace, W.T. (1934), *A Critical History of Greek Philosophy* (London).

Stace, W.T., (1967), *Man Against Darkness and Other Essays* (Pittsburgh, PA: University of Pittsburgh Press).

Stenger, Victor J. (1987), "Was the Universe Created?," *Free Inquiry*, 7[3]:26-30, Summer.

Tait, Katherine (1975), *My Father Bertrand Russell* (New York: Harcourt, Brace, & Jovanovich).

Tattersall, Ian (1998), *Becoming Human* (San Diego, CA: Harcourt Brace).

Taylor, A.E. (1945), *Does God Exist?* (London: Macmillan).

Taylor, Richard (1967), "Causation," in *The Encyclopedia of Philosophy*, ed. Paul Edwards (New York: Macmillan), 2:56-66.

Thaxton, Charles B., Walter L. Bradley, and Roger L. Olsen (1984), *The Mystery of Life's Origin* (New York: Philosophical Library).

Thompson, Bert, Brad Harrub, and Branyon May (2003a), "The Big Bang Theory–A Scientific Critique [Part I]," *Reason & Revelation,* 5:33-48, May.

Thompson, Bert, Brad Harrub, and Branyon May (2003b), "The Big Bang Theory–A Scientific Critique [Part II]," *Reason & Revelation,* 23: 49-63, June.

Thompson, Bert, Brad Harrub, and Branyon May (2003c), "The Big Bang Theory–A Biblical Critique," *Reason & Revelation,* 23:65-71.

Tipler, Frank (1994), *The Physics of Immortality* (New York: Doubleday).

Tolstoy, Leo (1964), "Religion and Morality," *Leo Tolstoy: Selected Essays* (New York: Random House).

Trefil, James (1996), *101 Things You Don't Know about Science and No One Else Does Either* (Boston, MA: Houghton Mifflin).

Tryon, Edward P. (1973), "Is the Universe a Vacuum Fluctuation?," *Nature*, 246:396-397, December 14. [Tryon's article was reprinted in *Modern Cosmology and Philosophy* (1998), ed. John Leslie (New York: Prometheus), pp. 222-225.]

Tryon, Edward P. (1984), "What Made the World?," *New Scientist*, 101:14-16, March 8.

von Mises, Richard (1951), *Positivism* (New York: Dover).

Watson, James D. (2003), *DNA* (New York: Alfred A. Knopf).

Weinberg, Arthur (1957), *Attorney for the Damned* (New York: Simon & Schuster).

Weinberg, Steven (1977), *The First Three Minutes* (New York: Basic Books).

Weiss, Joseph (1990), "Unconscious Mental Functioning," *Scientific American*, March.

Weisz, Paul B. and Richard N. Keogh (1977), *Elements of Biology* (New York: McGraw-Hill).

Wells, Jonathan (1998), "Unseating Naturalism: Recent Insights from Developmental Biology," *Mere Creation*, ed. William A. Dembski (Downers Grove, IL: InterVarsity Press).

Wheeler, John (1977), "Genesis and Observership," *Foundational Problems in the Special Sciences* (Dordrecht, Holland: Reidel).

White, Robert (1978), *Reader's Digest,* September.

Wilder-Smith, A.E. (1976), *A Basis for a New Biology* (Einigen: Telos International).

Wilder-Smith, A.E. (1987), *The Scientific Alternative to Neo-Darwinian Evolutionary Theory* (Costa Mesa, CA: TWFT Publishers).

Wile, Jay L. (2000), *Exploring Creation with General Science* (Anderson, IN: Apologia Educational Ministries).

Wilson, Edward O. (1998), *Consilience* (New York*:* Knopf).

Woods, Guy N. (1976), "Man Created in God's Image," *Gospel Advocate*, 118[33]:514,518, August 12.

Wylie, Evan M. (1962), *Today's Health,* July.

Wysong, R.L. (1976), *The Creation/Evolution Controversy* (East Lansing, MI: Inquiry Press).

Zacharias, Ravi (1990), *A Shattered Visage* (Brentwood, TN: Wolgemuth & Hyatt).

Zehavi, Idit and Avishal Dekel (1999), "Evidence for a Positive Cosmological Constant from Flows of Galaxies and Distant Supernovae," *Nature,* 401:252-254, September 16.

[AUTHOR'S NOTE: In 1996, Wayne Jackson and I co-authored a text on the existence of God that was published by Apologetics Press, and that served as the precursor to this volume. Because of their continuing relevance, portions of that volume have been incorporated into this book as well. I wanted to acknowledge that fact, and express my gratitude to Wayne for his invaluable assistance in the research and writing involved in the earlier work.]